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THE PHYSICIAN AND SCHOOL MEDICAL SERVICES

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THE participation of the United States in war brings, as an almost inevitable aftermath, a wave of popular interest in the health of the school child. After the Civil War, California passed legislation requiring the promotion of physical activities in all schools, and after World War I, many states enacted laws pertaining to medical examinations as well as to physical education. Today, stimulated by the Selective Service findings, a strong current of public interest has set in. No less than ten bills relating to school health were introduced in the Seventy-ninth Congress.

Considerable public money is now being spent on the school health program. Is it being spent wisely? The legislation referred to above demands even more expenditure. Health and education authorities charged with the responsibility for these programs need medical advice and guidance to develop effective programs. It is imperative that physicians give their attention to school health. Too frequently, policies have been made without the advice and co-operation of medical authorities.

With school health again on the threshold of further development, it is important to take stock of its assets and liabilities and to suggest ways in which organized medicine can further improve the health of school children.

PRESENT STATUS OF LEGISLATION

At present forty-three states have laws permitting or requiring physical examination of children in school. These laws should be studied in the light of modern knowledge about child health, because many should be modified or even repealed. Some of the statutes are too restrictive — for example, those specifying that no clothing or perhaps only the shirt may be removed; others are too specific — for example, those requiring a medical examination of every child every year by the school doctor and those requiring that the examination be done by one person, such as the teacher, principal or school nurse.

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Thirty-four states have mandatory statutes covering physical education, many of which also need study and modification; there is a great range in requirements, varying from ten minutes a day or one period a week to sixty minutes a day or five hours a week. In forty-five states health instruction is treated in more or less detail in the courses of study. Has a medical committee ever reviewed these questions to determine if up-to-date facts are being taught? In one state, at least, the medical society has appointed a committee for the purpose of reviewing the courses of study with the state education authorities.

The legislation has not been consistent at either the state or the local level so far as the governmental agency responsible for the health service is concerned. In thirty states with laws requiring physical examination, the education department has the responsibility in eleven, the health department in eight and the two jointly in the remainder. On the other hand, from prepared reports by state health departments throughout the country, it appears that in twenty-six states public-health agencies play some role in developing the health service at the state and local level. There is even greater confusion regarding jurisdiction on the local level. In urban centers with populations of 10,000 or more, education authorities usually control the health service; no data for rural areas and for communities with populations under 10,000 are available. Health departments, where they exist, render some service in these sections.

The data on the administration of school health service in urban communities are presented in Table 1. To complete the picture, the type of service rendered, the agency responsible and the amount being spent in rural areas must be known. More than half the school children in this country live in communities with populations of 2500 or less. The current nationwide study of child health services of the American Academy of Pediatrics[1] will no doubt supply information on this point. State and local medical societies, however, can take steps to review

their local regulations to determine if it is necessary to repeal, modify or reinterpret any statute pertaining to school health with a view to improving the quality of medical services and bringing up-to-date health instruction to the schools.

How much has been accomplished in the health of the child of school age? Since World War I, immunization against smallpox and diphtheria has become a standard practice by family physicians as well as by schools and public-health services. The science of nutrition has had widespread application

TABLE 1. *Administration of School Health Service in Urban Communities.**

RESPONSIBLE AGENT	COMMUNITIES WITH POPULATION OVER 100,000		COMMUNITIES WITH POPULATION OF 30,000–99,999		COMMUNITIES WITH POPULATION OF 10,000–29,999	
	NUMBER	PER-CENTAGE	NUMBER	PER-CENTAGE	NUMBER	PER-CENTAGE
Board of education	47	65	114	71	345	75
Health department	22	31	36	23	41	9
Joint	3	4	9	6	75	16

*Based on data contained in a study, "Present Status of School Health Service and the Necessity for Health-Department Participation," presented at a meeting of the Association of State and Territorial Health Officers, Washington, D. C., April 12, 1945.

to these children. The legislation relating to medical inspections in schools has undoubtedly placed many children in the hands of physicians for treatment that otherwise might not have been received. Health education through physicians and nurses and through other channels, including the schools, has brought knowledge about available health protection to many homes. The application of this knowledge is reflected in the spectacular decrease in mortality rate among children five to nineteen years of age (Table 2). The decrease in the total death rate was 64 per cent in the group five to nine years of age, 59 per cent for children ten to fourteen years of age

TABLE 2. *Death Rates from All Causes among School Children.**

AGE GROUP	DEATH RATE 1923	DEATH RATE 1943	DECREASE
yr.	*per 100,000*	*per 100,000*	%
5 to 9	250.9	89.8	64.2
10 to 14	194.9	79.5	59.2
15 to 19	350.2	157.9	54.9

*Based on data available from Metropolitan Life Insurance Company.

and 55 per cent for those fifteen to nineteen years of age. Tables 3 and 4 demonstrate the decline in some of the principal causes of death. Automobile accidents in the group fifteen to nineteen years of age, as might be expected, constituted the only cause that registered a percentage increase.

These accomplishments are the result, in part at least, of better child care administered by family physicians and parents, but school nurses and physicians and teachers have made some contribution, although an immeasurable one, through their teaching and alertness to the signs of illness and through periodic medical inspection. In spite of this undeniable improvement, certain aspects of school

TABLE 3. *Death Rates from Specified Causes among School Children Five to Fourteen Years of Age.**

CAUSE OF DEATH	DEATH RATE 1923	DEATH RATE 1943	DECREASE
	per 100,000	*per 100,000*	%
Communicable diseases† (including diphtheria, scarlet fever, measles and whooping cough)	41.3	3.1	92.5
Tuberculosis	21.1	4.3	79.6
Pneumonia†	18.0	4.4	75.6
Rheumatic fever and organic heart disease	20.7	8.0	61.4
Appendicitis	13.6	4.0	70.6
Accidents, total	45.5	25.6	43.7
Accidents, automobile	18.3	8.8	51.9

*Based on data available from Metropolitan Life Insurance Company.
†Comparison of 1922–1923 with 1942–1943.

health service should be strengthened if the advance in child health is to continue.

In localities where such services exist, there is frequently inadequate quality of medical service in the school, and relations with the practicing physicians and other treatment resources in the community are poor. There has also been lack of cooperation between the education and public-health agencies in the community, and the health services in the school have not been planned to provide a satisfactory learning experience for the children.

The following points are essential to the improvement of school medical service: co-operation between education and public-health authorities, provision for health services in the school that are satisfactory learning experiences for children, properly qualified school health personnel and the development and strengthening of relations with the medical profession. Obviously, these four factors do not com-

TABLE 4. *Death Rates from Specific Causes among School Children Fifteen to Nineteen Years of Age.**

CAUSE OF DEATH	DEATH RATE 1923	DEATH RATE 1943	DECREASE
	per 100,000	*per 100,000*	%
Tuberculosis	110.7	23.8	78.5
Pneumonia†	45.4	10.0	78.0
Appendicitis	15.4	4.7	69.48
Rheumatic fever and organic heart disease	28.9	14.3	50.5
Accidents, total‡	55.5	38.1	31.4
Accidents, automobile‡	11.1	18.1	63.1 (increase)

*Based on data available from Metropolitan Life Insurance Company.
†Comparison of 1922–1923 with 1942–1943.
‡Comparison of 1923 with 1941.

prise all the elements of the school health program. For a comprehensive outline of policies relating to the entire matter, the Committee on School Health Policies of the National Conference for Co-opera-

tion in Health Education[2] has recently published recommendations that every physician should read.

Co-operation between Education and Public Health

Too often, educational and health authorities have been at odds over the responsibility for running the program of school health. Health departments in nearly every state are involved, but so are education departments. Whatever service is rendered by health departments to children while they are in school involves the school administration. The schools include about one fifth of the total community population, and everyone has had contact with the schools. It is the only agency employing trained educators in the ratio of 1:40 in the population reached. Moreover, it is another avenue to the home. On the other hand, the public-health department knows the health problems, the health facts and the health resources of the community.

A growing number of health officers and school administrators are discovering the help that they can be to each other. In some places the two departments, with the aid of other interested groups such as the medical society, have developed a statement of policy to cover school health work. The recommendations of the Committee on School Health Policies,[2] referred to above, were an outgrowth of a state committee that the Connecticut State Medical Society helped to initiate. Some states have made formal arrangements to continue this co-operation by establishing a joint committee or council of state and school health. A recent inquiry sent to health and education departments in the United States revealed that practically all the states have some machinery for co-operation between the two departments and that twenty-seven have formal plans for such co-operation. The war appears to have been a factor in stimulating closer working relations between the departments — just as it has between nations. Such a union cannot be dispensed with, any more than that of the nations can.

Making Medical Service a Learning Experience

The two prime purposes of school-health services are to reveal health problems and thereby to call the child to the attention of his physician for treatment, and to create in the child and the parents understanding and desire for preventive medical service.

Medical examination in schools — as performed annually or routinely — has been severely criticized both as a costly and inaccurate case-finding method and as an unfortunate educational experience. Since educators and pediatricians realize that medical procedures in schools have educational implications, the trend is toward fewer but more thorough medical examinations for individual pupils. The value of the presence of the parent at the examination, especially of younger children, in terms of health education as well as treatment, has been demonstrated; 25 per cent more children received medical care when the parent was present than when the parent was absent. The school physician, in appraising the health status of the child, should utilize information based not only on the physical examination but also on the interview with the parent and, frequently, with the school nurse, teachers and other members of the school staff. The school examination should include a conference with the parent of the young child and with the older child himself, to review the findings, to plan care, to give personal health guidance and to interpret the child's health needs.

That this goal has not been attained may be surmised from the comments of high-school students on their medical examinations in the school. "The whole impression you get," said one boy, "is that it [the medical examination] is something that applies to gym and that all they want to do [meaning the school authorities and physicians] is be sure that you can stand up long enough to get through it." Another student remarked: "There are questions we should like to ask the doctor, but he is always in such a hurry." "The school doctors don't examine you all over," another youngster complained, "they take a look at your eyes and, if you happen to have a sore throat, they tell you to get your tonsils out." Other children stated that the schools should provide doctors who are interested and doctors who like their profession. Obviously, these students found the medical examination a superficial, hasty procedure conducted by a physician who did not ask questions about health, in spite of the fact that the medical profession has long maintained that the school medical examination is the most "teachable moment" — the best educational opportunity that exists in the schools.

Preparation of Personnel

The medical examination of school children is usually performed by a part-time physician — a local practitioner, as a rule — who is poorly paid for this work and who is usually given no opportunity for special preparation for it. If the average school physician has received instruction regarding his task, it usually concerns fulfilling the letter of the law. When the law requires annual, biannual or routine examinations, the physicians are put under pressure to do them as rapidly as possible. This results in fifteen, twenty or even sixty examinations an hour, with the result that the medical findings are often valueless. For example, the recent study of findings among the Massachusetts high-school students in 1941, as reported by Southworth, Latimer and Turner[3] shows a tremendous difference in the defects found among pupils in various schools. Postural defects range from 1 to 80 per cent, dental ab-

normalities from 5 to 79 per cent, visual deficiencies from 0.9 to 36 per cent and cardiac anomalies from 0.3 to 9 per cent. Whereas some difference between schools and communities is to be expected, the variation is so great as to place the validity of the findings in doubt. Physicians have a responsibility to help to improve the quality of health examinations in schools.

Education of the School Physician

An extremely significant development regarding improvement in school health examinations is the publication by the American Public Health Association of a statement on the training and qualifications of school physicians. This report emphasizes the value of experience and instruction in pediatrics and education. The position of a school physician requires specialized public-health training, as well as a knowledge of the characteristics and behavior of normal and diseased children.

At the University of Michigan, a scholarship was recently established whereby a physician serves as assistant resident and resident in the Department of Pediatrics for twenty-four months. He also takes courses in the School of Public Health, after which he serves for at least a year as a full-time school physician at an annual salary of $6000. It is hoped that this may influence some physicians to enter the field of school health administration as a career.

The bulk of the preparation of school physicians is of necessity on-the-job training. In some communities time is set aside for meetings where the physicians are given instructions in certain aspects of child health and may even be given some understanding of modern education. Physicians welcome the opportunity to learn about school health when they obtain this knowledge from competent authority. State health departments, in co-operation with education departments and the medical societies, can and should help. Regional conferences or institutes can be held, authorities from medical schools, teacher-training institutions and schools of public health being invited to participate.

The administration and continued development of health services along the lines proposed require supervisory personnel. Physicians doing school work need the leadership and guidance that competent medical supervision can give. In most states, except for a few urban communities, this supervision is woefully deficient.

Consultant Service

Some school health programs have developed consultant service for special health problems revealed by the examination. For example, heart disease, which is a relatively frequent and serious finding in children of school age, is difficult to diagnose. Some communities do not permit the removal of clothing; the physician does not have the advantage of fluoroscopic or x-ray equipment or other laboratory aids essential to the diagnosis. In New York City, Cincinnati, Rochester and Syracuse, school children are referred by school physicians to a specialist, who has the advantage of more time and laboratory aids for a diagnosis. This service, which is provided with the approval of the medical society, is similar to that provided by health departments for the diagnosis of tuberculosis and some other diseases. By this careful procedure, more accurate diagnosis for a serious condition is assured, and modification of the school program can be based on a clearer understanding of the child's potentialities.

Medical Advisory Functions

Instead of giving all his attention to finding defects, the school physician should be encouraged to develop the guidance aspects of his services. His value to a school should be measured in terms of the advice he gives to the children, parents and teachers with whom he comes in contact. He should assume professional leadership, establishing relations with private physicians and clinics and bringing all community resources into closer connection with the school.

He should help to keep teachers conscious of health. When teachers have been properly informed what to look for in the behavior and appearance of pupils and encouraged to refer children to the physician, 80 per cent of the children will be found to merit his professional services. His work should be co-ordinated with that of the nurse at the time of the examination so that undivided attention is given to each child and parent. He should concentrate his efforts in the examination on the discovery of poor health habits, gaps in the knowledge of parents about health matters, health problems suspected by teachers, defects that obviously hamper learning and medically neglected children. These problems exist at every grade level. The program should be flexible and permit the school physician to be of service to children at any time in any grade.

With the parent present at the examination, with stress on adequate history taking, with emphasis on the interpretation of his findings to parent, nurse and teacher and with careful attention to the planning of aftercare of the child, the school physician can meet his educational opportunities and responsibilities. Under these conditions, his data are adequate, for he has not neglected facts provided by the teacher and the parents that relate to the educational, emotional and social problems of the child. His attitude toward his work will be more confident because he has a clearer understanding of his function in relation to the school and the community. His professional morale will be strengthened because he is giving his best judgment in a variety of ways each day.

The Teacher's Role in Health Service

Nyswander[4] demonstrated that the teacher's responsibility for observing the health of pupils can be made an effective part of the school health service. Teachers were prepared to observe and report to school nurses the health condition of pupils. The annual medical inspection was replaced by annual and semiannual conferences between the classroom teacher and the school nurse. After teachers had received preparation, eight out of every ten children selected in these conferences, when examined subsequently by the school physician, were found to have a health condition requiring further medical attention. The study also revealed that teachers need more knowledge of and experience in observing health behavior and recognizing health deviations. It should be understood that this preparation of teachers is not for the purpose of assuming work to save the time of nurses and physicians, but primarily to enable the teacher to perform more adequately an important responsibility. The Michigan Superintendent of Schools[5] has published a helpful guide to aid teachers in the observation of the health of pupils.

In reply to a recent inquiry that I forwarded to state education and health departments regarding teacher participation and observation of the status of the health of pupils, twenty-three out of thirty-six states recognized the value of teacher observation and the need for material, and eleven states had already prepared such material.[5]

Medical Relations

The most important aspect of school health service is that of the medical relation between the school medical service and the facilities for treatment in the community. As pointed out above, the main objective underlying the school health service is to ensure that something is done about children who have adverse health conditions.

With the development of school health work in this country, the case-finding or examination program has been considered the responsibility of the school physician, and treatment that of the community physician. The community physician may work in a clinic or in his own office; the family or community may pay him a fee or the service may be covered by some type of prepayment plan. Regardless of the circumstances governing the method of distributing medical care, what is done for the child depends on the knowledge, interest and skill of the physician, as well as the available resources for diagnosis and treatment. There is a gap between the physician who finds a problem and the physician who solves the problem; the road from the school to the source of treatment has been called the pathway to correction. Efforts to bridge that gap have occupied many millions of hours of thousands of faithful, earnest nurses, many of whom were guided by little or no direction or information. Frequently, the family never had any clear concept of its responsibility. And when the gap seemed bridged and the child was taken to a physician for further examination, the school's diagnosis was wrong or rejected, or no treatment or improper or inadequate treatment was given.

The school can be of aid in improving medical relations by developing in those who provide the treatment understanding and co-operation regarding the case-finding work in the schools. Many practitioners are indifferent to or perhaps hostile to its aims. I have known such physicians, who regarded the school health service as meddling with their patients. I have observed that mutual interest in the health of the child is usually a common ground for understanding. When the practitioner understands that health service can aid him both in diagnosis and in follow-up study, as well as treatment in special circumstances, he becomes the essential link in the chain of health care for the child. Practitioners in the community need to be kept informed of school health practices through their meetings, bulletins and so forth.

The school must also create confidence on the part of the practitioner in the school's medical findings, which the physician often mistrusts. He has had children referred by the school for treatment when he has already advised the family, on the basis of previous knowledge and observation of the child, that such treatment was not necessary. In individual cases, the remedy lies in informing the practitioner of the circumstances behind the referral. For example, in a case of diseased tonsils, the family physicians may not have seen the child for a year or more, although the child may have been sent home by the school nurse with acute tonsillitis on more than one occasion during this period. If the school puts this information in the referral note to the practitioner, his diagnosis and treatment may be influenced.

Pediatric and other consultative services should be provided for the physician. Many of the conditions in school children requiring treatment call for special professional skill — for example, dental care, visual and hearing defects, and rheumatic fever and rheumatic heart disease. This is particularly true in rural areas, where specialists in these fields are often not available. The element of higher costs is also involved in the treatment of these conditions.

The development of methods based on these principles would improve medical relations with the physician, in both the office and the clinic, concerning what goes on in the school, how the school health service functions and what the health needs of children are and, most important, would encourage the use of all the modern facilities for diagnosis and treatment. The attainment of this

end calls for special training of school physicians and nurses to aid them in their work with individual physicians in the community.

Another principle, which is a logical development at this point, is the greater participation of the community physician in case-finding and in the medical examination. The gap between finding the case and obtaining treatment was mentioned above, and some ways of bridging it have been suggested. Another means is to have the school examination done by the community physician. Many school systems have rejected this idea — some on the grounds that if the outside physician is encouraged to participate, the school physician will not have a job, and others on the basis that examination by the former is not so carefully done as that done by the latter. But many children have had some medical attention prior to entering school. Therefore, the family should be encouraged to employ the physician to whom the child may already be accustomed and who, under these circumstances, may know far more about the child's health than the school physician is likely to learn from the brief contact with the child in school. If treatment is needed, the child is already at the treatment agency, and time would be saved in follow-up examination. Furthermore, if the physician carries a part of the responsibility for examination, the school physician will be released for further advisory service to principals and teachers in the schools.

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Medical understanding and leadership are needed in the school health program. This is recognized by some state medical societies, one of which has encouraged county medical societies to name committees on school health, with the result that committees have been formed in forty-four out of sixty-one counties within the last two years. Recently, the Massachusetts Medical Society named a committee to study the ways and means of improving the school medical services.

Although school health has advanced from the earlier days when it was mainly concerned with the control of contagious diseases, there is a great deal of room for improvement. State laws are in many respects outmoded. The quality of the medical service in the schools is often of a low order. Cooperation between health and education departments should be encouraged, and there should be a much closer working relation between the school and the practicing physicians in the community. A committee of a medical society might initiate specific activities to improve the quality of the school medical service. A program of teaching sessions, institutes or seminars should be planned in cooperation with health and education departments to refresh school physicians about child growth and development and other medical problems of children — especially nose and throat conditions, allergy, endocrinology, rheumatic fever and mental health. Standards of qualifications for school medical personnel should be developed and employed. A statement on the type of medical examinations to be done in the schools should be drawn up. If necessary, repeal, modification or reinterpretation of state laws to permit proper medical examinations in the schools should be obtained. Finally, adequate remuneration for the services of the school physician should be guaranteed.

The improvement of all service for children cannot take p'ace without thorough understanding of current programs. If the health of children is to be safeguarded and necessary treatment given, planning of programs must be done in co-operation with educational and medical authorities in the community. Mistakes in school health programs are thereby less likely to be repeated, and some may even be rectified. Certainly, in this way, adequate health care and supervision of school children is likely to be achieved.

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PHYSICAL REHABILITATION OF DISABLED PERSONS*

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THE following statement of the purposes of rehabilitation programs[1] provides an excellent analysis of the co-operation of all groups that will be necessary:

> The goal of any rehabilitation program is to achieve the maximum function and adjustment of the individual and to prepare him physically, mentally, socially and vocationally for the fullest possible life compatible with his abilities and disabilities.
>
> In the establishment of any rehabilitation project it must be realized that industry is the keystone in the whole structure because industry must take the finished product and, by careful and selective placement, utilize these individuals within their capabilities. Labor must understand that the third phase of medical care — rehabilitation — is a service and right that must be made available to all citizens in a democracy and that they have a right to expect such opportunities. The medical profession, governmental and social agencies, insurance companies, and individuals must be made cognizant of the opportunities available in a comprehensive, well-rounded program of rehabilitation and that with such a program, handicapped individuals may be transformed from dependent invalids into contributing, self-respecting, self-supporting citizens.

Every social minded person will agree with these conclusions, and one of the greatest problems that the Nation faces today is the rehabilitation of the physically, emotionally and economically disabled. Eugene J. Taylor,[2] formerly chief, Education Branch, Convalescent Service Division, Office of the Air Surgeon, has summarized the implications of the question as follows:

> We had in America prior to the onset of World War II some twenty-three million persons disabled in some degree from disease, accident or earlier wars. Each year there are some 350,000 persons disabled outside of military service. We had in 1940 some six and a half million disabled males between the ages of 15 and 64 years, men who normally would be income-producing. These six and a half million plus the number of disabled or handicapped veterans being discharged from our military hospitals will give us, when demobilization is completed, approximately eight million working-age males who are disabled to the extent of requiring physical or vocational rehabilitation or special placement aids if they are to be adequately employed. This represents one person in sixteen in our general population and one in seven in our male working population.
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> We have had during four years of war, a total of approximately seventeen thousand amputations in the Army, but we have nearly 120 thousand amputations from disease and accident among our civilian population in that same period. Eleven thousand soldiers were wounded on the beaches of Normandy in the first ten days after "D" Day, yet even with curtailed traffic, automobile accidents alone accounted for more than twice that many civilian casualties in the same ten days.
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> The problem of the disabled and handicapped is not a new one. War has only focused the microscope of public interest on this great national problem and quickened the necessity for its solution.
>
> The work of the Office of Vocational Rehabilitation has demonstrated how adequate vocational rehabilitation pays off economically. The 43,997 persons undergoing vocational rehabilitation in 1944 received prior to their rehabilitation an average annual wage of $148.00. After rehabilitation, the average annual wage of the group jumped to $1768.00. For the entire group, prior to rehabilitation, the total earnings were $6,510,556. After rehabilitation the earning power of the same group jumped to $77,786,696. This gain represents a return of $47 for every $1.00 invested.
>
> No amount of money can measure the social and moral satisfaction gained by the successfully rehabilitated and employed handicapped worker and his family. Nor can it measure the value to society of the transformation of these individuals from dependents to productive, self-reliant persons.

A study of the medical aspects of the problem indicates that the medical profession has often failed to contribute its share in attaining the objectives of rehabilitation. Physicians and surgeons have become so interested in the technologic phase of medicine that the humanistic aspect has often been forgotten; they have been so engrossed in treating the disease that the patient has often been forgotten. As a result there is a gap between the present practice of medicine and the needs of the patient. Unless the disabled person is rehabilitated to the fullest possible life compatible with capability, the physician has failed in his duty to the patient.

What are the basic needs of the disabled? In twenty-seven years of experience at the Institute for the Crippled and Disabled, such needs have been found to be the ability to walk and travel, to care for the daily needs and to have the maximum use of the hands. No patient should be discharged from a hospital until he has reached his maximum ability in attaining these three objectives.

The present procedures in a great majority of hospitals deserve consideration. The surgeon amputates the limb. The patient recovers from the operation in good condition, and the stump is all that could be desired. The surgeon is too busy from morning to night in consultation, teaching and operating to be expected to give the time to or become interested in the slow, laborious and protracted third phase of medicine. But someone must apply the bandages to shrink the stump, exercise what remains of the limb, prevent contractures, teach the patient how to use crutches and recommend the proper type of prosthesis. Many months later, the patient must be taught how to use his artificial limb in walking, climbing stairs, sitting down and arising from chairs, getting into or out of a bus or car and all the other activities necessary for daily living and working.

A prominent surgeon had a cerebral hemorrhage that resulted in a right hemiplegia. He asked his medical and surgical friends for assistance, and they all told him he had hemiplegia following a cerebral

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hemorrhage. "I know that," he said, "but what can you do to help me?" His desire was to learn how to walk, to care for his daily needs and to have the maximum use of his hands so that he could return to his practice of medicine. The morale of these patients quickly rises when they are taught to walk with a crutch or cane, to lace their shoes and tie a bow with one hand, to cut their own meat with a special knife, and to learn left-handed writing and the many other activities necessary for self-care.

Massage, electricity and exercise are useful forms of treatment, but functional activities to meet the needs of the patient have more basic therapeutic value because they lead to independence. Better results are obtained by working *with* the patient than by working *on* him.

More than a thousand soldiers, and many times that number of civilians, have a loss of motion and sensation of the lower extremities with incontinence, as a result of spinal-cord lesions. By proper rehabilitation procedures every one of these patients with a dorsal or lumbar lesion can learn to travel with braces and crutches and to care for his daily needs and can be trained in a useful vocation.[3]

The procedures for meeting the needs of the patient are a function of specialists in physical medicine. A recognition of the needs of the patient and the sources from which they may obtain help will aid physicians and surgeons to restore their patients to the maximum capacity.

The six principal groups of seriously disabled patients needing rehabilitation are the blind and partially seeing, the deaf and hard of hearing, the cardiac, the tuberculous, the neuropsychotic and those generally classified as orthopedic. The restoration of the person with a so-called "one-organ" or "special-organ" disability is not such a difficult problem, because only one organ is involved. The blind cannot see, the deaf cannot hear and the cardiac and tuberculous patients need guidance on the amount of work they can perform. Rehabilitation is infinitely complex in the neurotic and psychotic patients because of the influence of the mind on the body and the intangible intricacies thereof. Not much less difficult, however, is the rehabilitation of the orthopedically disabled because of the great variety of conditions that may occur. When one considers the hundreds of muscles, bones, ligaments and joints and the vast network of blood vessels and nerves supplying the extremities, the number of possible disabilities is impressive.

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Rehabilitation begins on the day when definitive medical treatment is no longer required. The procedures that have been found most successful in Bellevue Hospital are as follows.

Consultation

When the physician or surgeon decides that medical or surgical treatment is no longer needed, the physician in charge of physical medicine is called in consultation. No patient is accepted for treatment without a consultation. On the department referral form are recorded the patient's name, age, sex and vocation, the date of onset of the condition and the date of admission to the hospital. The intern or resident gives all the information concerning the patient and the re-establishment of function that is indicated. From this information the etiology, diagnosis and results desired are recorded.

If the patient is referred from the outpatient department, the information is obtained from the hospital records and the physician's referral form.

Physical Examination

The purpose of the physical examination is to obtain data concerning the disability resulting from the injury or disease, the extent of the disability and the handicap produced by the disability.

The disability. The so-called "orthopedic disabilities" caused by congenital defects, disease or trauma affect the proper functioning of bones, muscles, joints, ligaments, brain and nervous system and produce disabilities limiting movement of the joints or action of the muscles. Fractures, tuberculosis and osteomyelitis of bones, arthritis of the joints, the dystrophies of muscle, sprains and dislocations produced by injuries to ligaments, cerebral palsy, brain trauma, poliomyelitis, multiple sclerosis and transverse myelitis that affect the brain and spinal cord produce disabilities that result in decreased motion or loss of motion at the joints or changes in the normal strength of muscles, or both. It is the physician's responsibility to record the disability, since rehabilitation is concerned with the incapacity and not with the diagnosis.

Extent of disability. It is impossible to evaluate the results of treatment unless the extent of disability is recorded. This information is obtained for the physician by physical therapists who are trained in these procedures. The method of measuring and recording limitations of motion can be illustrated by the following case. A patient fractured the radius by falling on the ice. The fracture had healed, and rehabilitation procedures were indicated because of a flexion deformity at the elbow. The record of the physician disclosed that the cause was trauma, the diagnosis, a fracture of the radius and the disability, limitation of motion at the elbow joint. The extent of the limitation of motion had to be ascertained. The normal range of motion at the elbow is from 180° in extension to 35° in flexion. The therapist measured the range of motion with the goniometer and recorded the extent of disability as 140° in extension and 60° in flexion. This indicated that the patient needed 40° more motion in extension and 25° in flexion.

By this method of recording the limitation of motion, the physician can determine at a glance the extent of the disability. It is also possible to evaluate

the results of treatment by having the therapist remeasure the motion in the joint and record the findings on the chart each week.

When the disability produces muscular weakness it is necessary to evaluate the extent of disability by testing the muscular power of the parts of the body affected. The therapists have been trained to evaluate muscle power and the findings are recorded in the following manner. A patient with a "dropped foot" following poliomyelitis has a disability consisting of flaccid paralysis of the leg and foot, the extent of the disability being a trace of dorsal flexion, normal plantar flexion, poor inversion and good eversion. It is only when the strength of a given group of muscles producing a movement is known that the danger of overworking weak muscle groups may be prevented, the proper remedial exercises prescribed and the treatment evaluated. Muscle strength can be further evaluated by giving each of the twelve degrees of muscle strength a unit value of one — these are referred to as "units of motor function."

The handicap produced by the disability. The purpose of any treatment is to prepare the patient to meet the physical demands of daily living and working. It is impossible to determine from the measurements of joint motion and strength the ability of a person to perform functional activities. The only method of evaluating such ability is to have the patient perform the activity.

What are the activities necessary for daily living? They have been found to be walking and traveling, caring for daily needs and the maximum use of the hands.

Our test of the physical demands of daily living consists of thirty-seven activities.[4] The patient travels around the testing area performing each activity as he progresses. He is given instruction on the activity to be tried and the need for the activity in daily living. The activities that cannot be performed are included in the daily program.

* * *

The carrying out of such a program is part of the hospital treatment of every patient. Patients leaving the hospital should be able to walk and travel and care for their daily needs if the gap that exists between the practice of medicine and the needs of the patient is to be bridged. Physicians and surgeons do not have the time or interest to perform this evaluation and rehabilitation program, which should be carried out by specialists in physical medicine. The object cannot be accomplished by heat, light, water, massage or electricity or by weaving and making toys in occupational-therapy shops; it can be attained only by working with patients, showing them their limitations and motivating them to accomplish the activities necessary for daily living.

Before returning to work, a person who has been injured should be tested in the factors necessary for working. After seven years of research the War Manpower Commission[5] published a book that gives an analysis of physical demands for several thousand vocations in terms of functional activities, such as walking, standing, pushing and lifting. Of the twenty-five activities listed, twenty depend on the movements of the joints and strength of the muscles. Before a disabled person is placed on a job the physician decides which of these physical factors he has partial capacity or no capacity to perform. It is my firm conviction, based on the experience gained from examining thousands of orthopedically disabled persons, that an attempt to predict the physical activities that can be performed by a disabled person on the basis of inspection or even of a muscle test is unscientific and unfair to the patient. No one can predict with any degree of reliability the compensatory ability of a disabled person to perform functional activities until he tests the person in that activity.

We are now developing a test that will indicate the ability to perform these twenty-five activities that the patient can take to his employer when he returns to work. The employer will thus be able to compare the activities essential to the job with the worker's ability to perform them.

* * *

In summary, rehabilitation of the physically disabled requires that definite procedures be followed to attain success. They are a knowledge of the cause, diagnosis and disability; an evaluation of the extent of disability in terms of limitation of motion and strength; an evaluation of what activities, essential to daily living and working, the disabled person can accomplish; and a program that teaches the patient how to achieve the maximum function for the fullest life compatible with his abilities and disabilities.

The accomplishment of these objectives is the function of physical medicine. They cannot all be accomplished in the hospital. In the near future every city will have rehabilitation centers, where patients will be sent after discharge from the hospital, in which the patients will live if they are ambulatory or to which they will report daily as outpatients if they can walk and travel. They will be required to work all day to attain their maximum physical, mental, social and vocational rehabilitation and adjustment. Such centers will enable a disabled person to retain his self-respect and become self-supporting. Industrial firms will save pensions. Labor will save a valuable workman. The Government will have another taxpayer. Relief rolls will be reduced. Thus, the third phase of medical care will be developed, and the gap that

exists between the practice of medicine and the needs of the patient will be bridged.

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A COMPARATIVE STUDY OF PENICILLINS X AND G AND CRYSTALLINE PENICILLIN G*

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FOUR different fractions obtained from the mold *Penicillium notatum* have been identified. These have been named penicillins F, G, K and X.[1] The two that have received the greatest attention are the G and X fractions. Many commercial preparations containing varying percentages of these two fractions have been employed clinically with little attention to the actual composition of each product. This practice seems to be justified if studies of these two fractions reveal no significant differences in their properties, but is not justified if either is found to be superior. Accordingly, a study comparing the absorption, excretion, therapeutic activity and toxicity of penicillin G and penicillin X, and the in vitro sensitivity of various bacteria to these fractions was undertaken. For this purpose, the following preparations were employed: commercial penicillin, which contained at least 90 per cent of penicillin G, crystalline penicillin G¶ and penicillin X,‖ consisting of 75 to 95 per cent of the active substance. Since there were no differences in the results obtained with the various penicillin X preparations, they are all referred to below as penicillin X. Commercial penicillin has been interchangeably called plain, regular and ordinary penicillin and penicillin G.

Absorption and Excretion

Figures 1, 2 and 3 demonstrate the median values of the blood concentrations obtained at various time intervals with each preparation. The number of assays from which each of these values was determined varied between three and twenty-one. The blood concentrations obtained following the administration of penicillin X were consistently higher, and the duration of bactericidal activity was longer, in comparison with those of commercial penicillin and crystalline penicillin G. No significant differences were observed in the height or the duration of the blood concentrations obtained following the administration of commercial penicillin and crystalline penicillin G.

Excretion studies revealed that when 100,000 units of penicillin G and penicillin X were administered intramuscularly, the former was found in the urine for eighteen hours, whereas the latter was present for at least twenty-four hours. The amounts recovered in the urine were 75 per cent of the penicillin G and 55 per cent of the penicillin X.

These observations agree essentially with those of other investigators. Ory et al.[2] found that the blood concentrations after the administration of penicillin X were significantly higher and more prolonged than those after the intramuscular injection of the same number of units of regular penicillin. Likewise, Welch and his co-workers[3] noted that after the administration of 25,000 units of penicillin X and of regular penicillin the former product consistently maintained a higher blood concentration after two hours, and that the percentage of penicillin X recovered in the urine was smaller than that of penicillin G. Meads and his associates[4] observed, however, that regular penicillin when administered orally yielded higher and more prolonged blood concentrations than penicillin X given by the same route, and they concluded that ordinary penicillin is less readily absorbed and excreted. No other reports on the absorption and excretion of crystalline penicillin G have been published.

In Vitro Sensitivity

One hundred and one strains of various bacteria, including staphylococci, streptococci, pneumococci, gonococci, meningococci and the influenza bacillus, were tested for sensitivity to penicillin X and to crystalline and commercial G fractions. The results of this study have been reported elsewhere.[5] In brief, it may be stated that no difference was noted

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¶Kindly supplied by Merck and Company, Rahway, New Jersey.

‖Kindly supplied by Lederle Laboratories, Incorporated, Pearl River, New York.

between the two penicillin G products. When the relative sensitivity of penicillins G and X was computed on the basis of weight, it was found that fifty-five strains were from two to sixteen times more sensitive to penicillin X, twenty-five were equally sensitive to both fractions, and twenty-one were two to four times more sensitive to penicillin G.

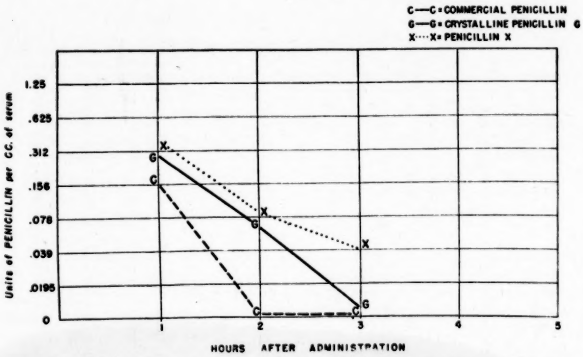

FIGURE 1. *Median Values of Blood Concentrations Obtained following the Intramuscular Injection of 15,000 Units of Commercial Penicillin, Crystalline Penicillin G and Penicillin X.*

fraction the organism also became more resistant to the other fraction, although not to the same extent. Similarly, several strains of bacteria that became resistant to fraction G in vivo were also more resistant to fraction X.

Welch and his co-workers[3] studied the in vitro action of penicillin X and commercial penicillin G

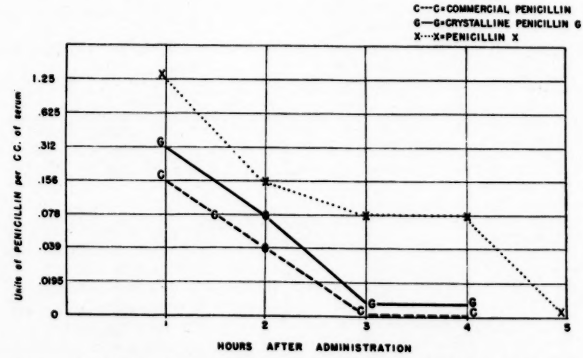

FIGURE 2. *Median Values of Blood Concentrations Obtained following the Intramuscular Injection of 25,000 Units of Commercial Penicillin, Crystalline Penicillin G and Penicillin X.*

Further experiments were performed in which the resistance of various strains of organisms to one of these fractions was increased in vitro. In each instance, when the resistance was raised to one on several strains of organisms, employing the unit as a measure of comparison. They noted that four strains of *Staphylococcus aureus* were equally sensitive to both fractions, but that one strain of *Kleb-*

siella pneumoniae and one strain of *Bacillus cereus* were more sensitive to penicillin X; penicillin X was three to five times more effective than commercial penicillin in the protection of mice against ten thousand lethal doses of Type 1 pneumococci. than to commercial penicillin and that most strains of pneumococci and *Streptococcus viridans* were twice as sensitive to penicillin X when the unit was employed as a criterion of comparison. Recently, Hewitt and Pittman[7] published the results

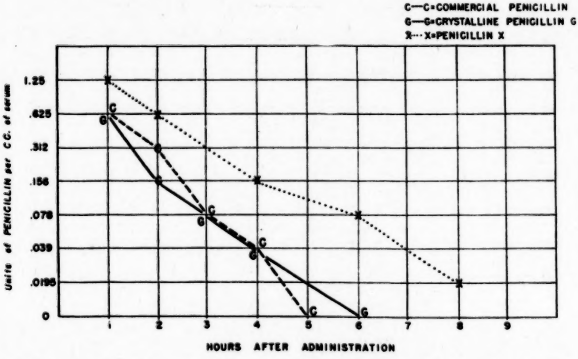

FIGURE 3. *Median Values of Blood Concentrations following the Intramuscular Injection of 50,000 Units of Commercial Penicillin, Crystalline Penicillin G and Penicillin X.*

Libby and Holmberg[6] observed that, with the exception of one strain of *Staph. aureus* and one strain of *B. subtilis*, the strains tested were more sensitive to penicillin X than to penicillin G, but of a study of the comparison of the in vitro sensitivity of thirty-eight strains of *Haemophilus influenzae* to penicillins X and G. They found that most strains were more sensitive to penicillin X

TABLE 1. *Results of the Treatment of Various Infections with Commercial Penicillin, Crystalline Penicillin G and Penicillin X.*

INFECTION	RESULTS WITH COMMERCIAL PENICILLIN		RESULTS WITH CRYSTALLINE PENICILLIN G		RESULTS WITH PENICILLIN X	
	IMPROVEMENT	NO IMPROVEMENT	IMPROVEMENT	NO IMPROVEMENT	IMPROVEMENT	NO IMPROVEMENT
Beta-hemolytic streptococcus:						
Scarlet fever	31	0	4	0	33	1
Erysipelas	1	0	1	0	3	0
Otitis media	8	0	5	0	6	1
Pharyngitis	11	0	4	0	11	0
Streptococcus viridans:						
Subacute bacterial endocarditis	15	3			1	2
Staphylococcus:						
Bacteremia	7	1	1	1	0	1
Cellulitis and abscess	10	0	3	0	10	0
Arthritis	4	2	1	0	1	0
Pneumococcus:						
Pneumonia	65	8	33	1	3	0
Meningitis	20	33	1	1	3	1
Gonococcus:						
Urethritis, cervicitis and vaginitis	36	0	3	0	6	0
Arthritis	5	8*	3	0	4	0
Vincent's angina	4	1	1	0	2	1
Suppurative diseases of lung (bronchiectasis and lung abscess)	0	12	0	1	0	1
Empyema	2	8	0	1	0	1

*Seven patients were treated with doses that were subsequently determined to be inadequate.

that the difference was less when the comparison was made on a weight rather than a unit basis. Ory et al.[3] reported that most strains of Group A hemolytic streptococci, gonococci and meningococci were two to eight times more sensitive to penicillin X and that this fraction was more effective in protecting the laboratory animals against the infection.

A tabulation of the results of our studies and those of other investigators reveals that about 50 per cent of the strains of bacteria tested were more sensitive

to penicillin X, and that the remaining 50 per cent were either equally sensitive to both fractions or more sensitive to the G fraction. With the exception of a few strains, however, the differences in the sensitivity of the bacteria to either fraction were not great.

Therapeutic Activity

Various infections for which treatment with penicillin has been established were treated with the preparations discussed in an effort to determine whether there were any differences in their therapeutic action. Strict alternation was impossible because of the limited supply, and each product was therefore used when it was available. Table 1 presents the infections and the number of patients treated with each type of penicillin. Some of the cases in which penicillin X was used were discussed in greater detail in an earlier report.[8] So far as could be determined, the three preparations were equally effective in the treatment of these infections. Although in vitro studies revealed certain variations in the sensitivity of the organisms to the types of penicillin, there was no obvious difference in the clinical response, either because the sensitivity of the organisms to each fraction was not varied enough to be of clinical significance or because the concentrations of penicillin obtained with the various regimes employed with all three products were higher than the sensitivity of the organisms, with the result that the lowest concentration was still bactericidal for the causative organism. The evidence available at present indicates that once a bactericidal concentration has been obtained a further increase in the concentration is not of added benefit.

Ory et al.[2] found that equivalent doses of penicillin X and commercial penicillin were equally effective in the treatment of pneumococcal pneumonia and other infections, such as staphylococcal bacteremia and severe cellulitis. These investigators considered penicillin X more effective than penicillin G in the treatment of gonorrhea when doses of 50,000 to 100,000 units were employed. Welch and his co-workers[3] reported a 94 per cent cure rate in a group of 68 patients with gonorrhea who were given one dose of 25,000 units of penicillin X, whereas only 64 per cent of a group of 58 patients were cured with the same dose of commercial penicillin. The course of therapy in acute gonococcal urethritis is short; thus, when small doses are given, the prolonged duration of bactericidal activity of penicillin X may account for the observed superiority of this fraction.

There may be two exceptions to the general statement that penicillin X and penicillin G are equally effective therapeutically in all other infections. In the first place penicillin X may be given at less frequent intervals than equivalent doses of penicillin G without loss of the therapeutic effect. Secondly, an occasional infection may be encountered, in which the causative organism is resistant to penicillin G but is sensitive to penicillin X. In such circumstances the greater sensitivity to penicillin X and the higher concentrations obtained with this product may become significant enough to warrant its use. Flippin and his associates[9] encountered such a situation in a patient with bacterial endocarditis, who was cured with penicillin X after penicillin G had failed to control the infection.

Toxicity

Toxic reactions to penicillin, such as fever, nausea, vomiting and dermatitis, have been observed. Most investigators report a low incidence, whereas a few state that toxic manifestations are not at all infrequent.[10, 11] All agree that the reactions are not serious, with few exceptions. The incidence in the series of patients under discussion was low — 7 cases in over 450 patients; almost all the reactions observed occurred in the early days of investigation when the products were impure. Six patients developed urticaria and one a fever. All the patients with urticaria had been treated with the impure commercial penicillin. Five developed symptoms during therapy, and the rash disappeared despite continuation of treatment. The sixth developed a generalized urticaria for forty-eight hours seven days after penicillin therapy had been discontinued. Delayed reactions to penicillin have been reported.[12, 13] The remaining patient developed a fever while convalescing from pneumonia on the fifth day of treatment with crystalline penicillin G; there was no increase in the severity of the illness, and the temperature returned to normal when penicillin was discontinued. A repeat dose of penicillin did not, however, cause a rise in temperature.

All three products were instilled in the lumbar intrathecal space in the treatment of meningitis. There were no untoward reactions so long as the doses given were less than 100,000 units and the period of injections less than six weeks. Similarly, no unusual reactions were observed following the instillation of these three preparations into other serous cavities.

* * *

A comparison of the properties of penicillin X, crystalline penicillin G and commercial penicillin G demonstrated that penicillin X achieves and maintains higher blood concentrations than the injection of similar amounts of penicillin G, whereas there is no essential difference between the crystalline and commercial penicillin G in this respect.

Most bacteria are more sensitive to penicillin X than to penicillin G, but the difference is slight when they are compared on a weight basis.

The therapeutic effects of all three preparations are similar, with a few exceptions.

The incidence of toxic reactions was low and independent of the type of penicillin employed.

It is concluded that in practically all infections caused by penicillin-sensitive organisms there is no obvious clinical difference between the effectiveness of the penicillin X and G fractions.

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TREATMENT OF CHRONIC OSTEOMYELITIS WITH STREPTOMYCIN

A Preliminary Report

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AT THE time of this writing no data on streptomycin as a specific agent in the treatment of chronic osteomyelitis had been reported in the literature. The results in the cases reported below are considered sufficiently successful to justify publication.

In World War II a major problem in the treatment of compound comminuted fractures was the resultant chronic infection. There is no doubt that penicillin played a great role in either eradicating or localizing infectious processes. Certainly, the bacteremias and septicemias following compound bone injuries so characteristic of World War I were the exception rather than the rule in World War II. Many soldiers, however, returned to the Zone of the Interior with bone injuries infected with mixed bacteria that failed to respond to penicillin therapy, even though thorough sequestrectomy and débridement had been carried out at overseas installations.

As Abraham and Chain‡ have aptly stated, the presence of gram-negative bacteria in a wound with mixed infection often inactivates penicillin by the production of the penicillin-inhibiting enzyme penicillinase. Certainly, the majority of gram-negative organisms found in the wounds of patients in the osteomyelitis section of the Cushing General Hospital can be classified as nothing more than secondary contaminants, and as such were not of too great significance from a purely pathological standpoint. In the main, these secondary contaminants were *Pseudomonas aeruginosa*, *Proteus vulgaris* and *Aerobacter aerogenes*. A careful study of the case histories, however, demonstrated that the organisms markedly prolonged wound healing. The usual local antiseptics, such as Azochloramid, acriflavine and Dakin's solution, which had previously been resorted to when penicillin failed in the treatment of chronic osteomyelitis, were of almost negligible or, at the most, highly questionable value in the so-called "open treatment" of chronic bone infections. One cannot underestimate the presence of pieces of clothing, shell fragments, necrotic tissue and sequestra as causative factors for prolonged drainage with bone injuries. The value of x-ray examination in ruling out the presence of many foreign bodies should not obscure the fact that nonopaque materials, such as small pieces of wood, glass and fragments of clothing, are often responsible for persistent drainage. Rather frequently, sequestra are so small or so obscured by adjacent and viable eburnated bone that they are not detected in routine x-ray plates. Of some value in the location of necrotic material is the placing of probes or the introduction of a contrast medium such as Diodrast in sinus tracts, followed by routine x-ray examination, but even these aids are not applicable in every case.

Prior to treating any cases of bone infection with streptomycin, we have considered the following factors: the predominant type of organisms cultured from the wound; in vitro studies repeated on at least three separate occasions during the week prior to the onset of therapy; the duration of the drainage; the failure of the drainage to respond to local anti-

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‡Abraham, E. P., and Chain, E. Enzyme from bacteria able to destroy penicillin. *Nature*, London **146**:837, 1940.

septics and to the sulfonamides; and the failure of penicillin therapy and radical sequestrectomy in the previous three-month period.

The patients in the 4 cases described below were initially treated by thorough débridement and excision of necrotic tissue and poorly vascularized granulations, as well as by sequestrectomy or saucerization under Pentothal anesthesia. The wounds were, of course, well irrigated with physiologic saline solution. Tourniquets were not used in order that postoperative bleeding and venous stasis might be minimal, thus avoiding dilution of the topically applied streptomycin. In cases in which adequate hemostasis cannot be obtained with hot saline packs at the time of operation, it is far better to pack the wounds with nothing more than vaseline gauze pressure dressings for the first twenty-four or forty-eight hours before streptomycin therapy is begun. On the third or fourth postoperative day, the patient is returned to the operating room, where usually, without anesthesia, the wound can be gently irrigated with hot saline solution and the entire wound bed exposed without further ooze or active bleeding. Gela foam or fibrin foam soaked in streptomycin is then applied to the entire wound surface. The purpose in using gela foam is twofold: to ensure that the entire wound surface is in contact with the streptomycin applied locally, and to promote healing and granulation.

The local dosage of streptomycin was arbitrarily set at about 150,000 units daily, whereas 200,000 units was administered intramuscularly every three hours for patients receiving combined therapy. At present we are treating wounds more grossly infected than those described below with dosages as high as 500,000 units intramuscularly every three hours, and the results have been excellent. Quite often we have observed that *Ps. aeruginosa* is highly resistant to streptomycin both in vivo and in vitro, but this obstacle is easily overcome by the substitution of a 1 per cent acetic acid solution for twenty-four hours. Before further streptomycin therapy is given, the wound should be thoroughly irrigated with saline solution, since streptomycin is rendered inactive in an acid medium.

Case Reports

Case 1. On February 18, 1944, a 37-year-old private was struck by an automobile while crossing a street in a midwestern state. He was taken to a hospital, where a diagnosis of compound and comminuted complete fractures of the left tibia and fibula, at the junction of the middle and proximal thirds, was made. The left leg was put in plaster from toes to groin after closed reduction of the fracture, following which the general condition was excellent. On March 7 the patient was transferred to a larger hospital, where it was learned that there was about 10 or 15° of posterior bowing of the tibial fracture and about 50 per cent contact between the fracture ends. At that time there was no definite callus formation. Laboratory examinations were essentially negative.

During the stay at the second hospital, the cast was wedged at the fracture site, and posterior and medial angulations were corrected. This change was corroborated by x-ray studies. Immobilization in the plaster cast was continued until April 26, when the cast was removed and gross motion at the fracture site was observed on physical examination. The denuded skin surfaces about the fracture also remained unhealed. A new long leg cast was applied to the involved extremity, and on July 21 the patient was transferred to the Cushing General Hospital.

At the time of admission there was no clinical evidence of union. Because of the poor condition of the skin of the involved extremity, operation was postponed, and the suppurative skin wounds were treated with sulfadiazine soaks, sulfanilamide powder and penicillin dressings. A sliding type of bone graft was carried out on October 5, but postoperatively the wound broke down and drained copious amounts of thick yellow pus in spite of combined penicillin therapy. On January 2, under intravenous anesthesia, the infected tibial graft was removed, the cavity and surrounding necrotic bone were curetted, and the wound was packed with penicillin-soaked gauze. At that time a large number of colonies of *Ps. aeruginosa* were observed in plate cultures from the wound. In May, since the patient's condition was essentially unchanged, a second sequestrectomy was carried out, but drainage continued unabated. In August the wound was sufficiently clean so that it was covered with a dermatome graft, of which 80 per cent took. Subsequent x-ray films, however, showed progressive bone destruction, and on February 5, 1946, a thorough saucerization of the proximal end of the tibia was performed. The postoperative course was stormy: the entire extremity became distended and painful, and the wound drained considerably in spite of Azochloramide dressings. Late in February, sulfanilamide irrigations were initiated, with poor results. Acriflavine also proved to be of no value.

In early March culture reports indicated that the predominant organisms in the discharge from the extremity were *Pr. vulgaris* and *Ps. aeruginosa*. In vitro studies showed that the organisms were sensitive to a solution of streptomycin containing 32 units per cubic centimeter. On March 11, under Pentothal anesthesia, the defect on the anterior aspect of the left leg was débrided, the skin edges were excised, and the wound was irrigated with physiologic saline solution and then packed with fibrin foam to which 150,000 units of streptomycin had been added. Starting with this date, 200,000 units of streptomycin was administered intramuscularly every 3 hours. In addition to the above therapy, the wound was irrigated three times daily with 10 cc. of streptomycin, or a total daily equivalent of 150,000 units. Two days later a large amount of autolyzed fibrin foam was removed from the depths of the wound, which was then irrigated with 500 cc. of physiologic saline solution. An excellent granulating surface was presented at that time. The entire area, however, was again resurfaced with fibrin foam to which 150,000 units of streptomycin had been added. Local and intramuscular therapy was continued as described above. On the 5th postoperative day local streptomycin therapy was discontinued, and irrigation with 1 per cent acetic acid instituted, since the contaminant had become resistant to streptomycin. On the 7th day after operation, under Pentothal anesthesia, the left lower extremity was thoroughly irrigated with physiologic saline solution and a dermatome graft applied to about 90 per cent of the defect. The remaining denuded areas were covered with pinch grafts. Intramuscular doses of streptomycin were continued up to the 7th day following the second operation. The graft was a complete success.

Three months later x-ray films revealed excellent callus formation about the sites of the fractures of the tibia and fibula, and a leg brace was ordered.

Case 2. On January 30, 1945, a 22-year-old soldier was wounded in action in Germany, sustaining a rifle-bullet wound of the left forearm and a fracture of the left radius, with complete paralysis of the left radial nerve. He was treated at a battalion aid station, where the upper extremity was splinted and dressed, and was subsequently sent to a collecting company, from which he was evacuated to a general hospital. Initially, the wound was débrided, and a plaster cast applied to the forearm. In April, because of loss of tissue substance about the middle third of the left radius, a skin flap to the left forearm was carried out, and a Roger-Anderson splint applied to immobilize the bone fragments. Following this procedure the patient was evacuated to the Zone of the Interior.

On entry to a general hospital, x-ray examination disclosed a 3-cm. gap in the proximal portion of the lower half of the left radius. There was a sequestrum adjacent to the proximal end of the distal fragments. No other abnormalities were noted besides the nonunion and marked osteoporosis. Shortly after admission, the sequestrum was removed. On October 1 a bone graft to the left radius was carried out, the left tibia being used as a donor site, but the graft broke down and thick, purulent material started to drain from the anterior aspect of the forearm.

At the time of his admission to the Cushing General Hospital, in January, 1946, the diagnosis was a compound, complete fracture of the left radius, with osteomyelitis and necrosis of the bone graft. On February 8 the bone graft was removed and sinus tracts excised, an indwelling catheter being inserted for subsequent penicillin therapy. In spite of this procedure and subsequent penicillin irrigations, as well as a course of penicillin intramuscularly, two sinus tracts over the volar aspects of the left forearm continued to drain a heavy, thick, purulent material.

Blood studies and urinalyses were within normal limits. On February 14, cultures of the material taken from the draining sinus tracts of the left forearm were reported as showing *Pr. vulgaris*, and the organisms were found to be sensitive to 0.5 units of streptomycin per cubic centimeter. On February 25, under general anesthesia, the sinus tracts of the left forearm were excised, and all necrotic tissue was débrided; hemostasis was obtained, and the wound was packed with fibrin foam soaked in streptomycin. At that time 200,000 units of streptomycin was given intramuscularly, every 3 hours. On the 1st postoperative day local irrigations with 150,000 units of streptomycin were initiated, in addition to the intramuscular therapy. Four days later, since cultures had proved the wound to be clean, a secondary closure was carried out, steel wire being employed as a suture material. Streptomycin continued to be injected intramuscularly (200,000 units every 3 hours) for a total of 7 days, at the end of which the sutures were removed. A few stitch abscesses developed at the periphery of the wound, but these were treated with streptomycin dressings and healed within a 5-day period. The forearm was then encased in plaster and remained well healed for the next 3 months, at the end of which x-ray examination revealed excellent callus formation about the radial bone fragments.

Case 3. On March 28, 1945, a 21-year-old soldier was wounded in action in Germany, sustaining a penetrating wound of the left hand. Shrapnel entered the dorsum of the hand, fracturing the 2nd and 3rd metacarpal bones, and x-ray films subsequently showed a marked loss of bone substance. The patient was treated in a nearby evacuation hospital, where débridement was carried out, and was then transferred to a general hospital in Paris, where the wound was secondarily closed. On June 14 he was evacuated to the Zone of the Interior, arriving at the Cushing General Hospital on August 13.

On entry, examination of the left hand showed a depressed adherent scar, with a small granulating area in its center, on the dorsal surface over the proximal ends of the 2nd and 3rd metacarpals. The index and middle fingers were about 2 cm. short, with obvious bone loss of the corresponding metacarpals. The extensor tendons to the index finger had been destroyed, but that to the middle finger was present. The flexor tendons were functioning normally but through a reduced range because of the adherent scar dorsally, and because of stiffening of the metacarpophalangeal joint secondary to immobilization. The nerves were intact. The diagnosis was a compound, comminuted fracture of the 2nd and 3rd metacarpals, with loss of bone substance.

On August 21 it was decided that, since there was not an appreciable amount of skin over the dorsum of the hand, a small abdominal-flap operation should be carried out, to prepare the finger for lengthening at a later date. On October 11 an abdominal flap was attached to the left hand, and 3 weeks later the flap was detached and inserted.

On January 15, 1946, it was suggested that since the flap on the dorsum of the hand was in good condition, the patient should be transferred to the Hand Section for a metacarpal bone graft. On February 1 the bone graft was carried out, the metacarpal defect of the index finger being filled in and the tibia being utilized as a donor site. Three days postoperatively the patient began to run a septic temperature and complained of severe pain over the dorsum of the hand. The cast was therefore removed, and the wound was found to be grossly septic. On February 8 cultures of the material draining from the dorsum of the hand were reported as showing *A. aerogenes*, and a few days later these bacteria were found to be sensitive to 0.5 units of streptomycin per cubic centimeter. Since the wound continued to drain profusely in spite of penicillin administered intramuscularly and locally, the ulnar aspect of the abdominal flap on the dorsum of the hand was incised and the surrounding necrotic tissue excised on February 26. The incision was carried down to the dorsum of the bone graft, which appeared to be viable. After thorough irrigation with physiologic saline solution and careful control of excessive bleeding, the wound was packed with fibrin foam soaked in streptomycin. A vaseline dressing was applied to the wound, and the hand was set up in so-called "cock-up position" with the aid of a splint. Postoperatively, 50,000 units of streptomycin was injected locally into the wound each day, and 200,000 units was administered intramuscularly every 3 hours. On March 1 specimens were taken from the wound for culture, as well as a small amount of fibrin foam for streptomycin sensitivity tests. Since the wound still appeared to be septic, it was thoroughly irrigated with physiologic saline solution and streptomycin; all remnants of the fibrin foam were removed, and a partial closure was carried out with No. 40 cotton suture, except in the center of the incision, where a small piece of Penrose tubing was placed. Two days later the rubber drain was removed, since the wound appeared to be clean. For a total of 7 days 200,000 units of streptomycin was continued every 3 hours. The skin flap healed rapidly.

Fifteen days later, when the patient was to have a plaster cast applied, the skin flap over the dorsum of the left hand again broke down, draining a small amount of yellow purulent material. Cultures of the drainage were reported as showing *Escherichia coli*, sensitive to 32 units per cubic centimeter of streptomycin, and *A. aerogenes*, sensitive to 4 units per cubic centimeter. Local irrigations consisting of 30,000 units of streptomycin were initiated at once and continued for a period of 10 days, at the end of which the wound had healed spontaneously. Three months later the wound remained closed, and x-ray films revealed excellent callus formation about the metacarpal graft.

Case 4. On February 7, 1945, a 20-year-old soldier was injured in Werben, Germany, by a land mine, sustaining injuries to the left thigh, leg and foot and to the right buttock, knee, leg, and foot. These injuries included compound and comminuted complete fractures of the right tibia and fibula, as well as paralysis of the right peroneal nerve. The wounds were débrided, and the right lower extremity was splinted at a first-aid station. On arrival at an evacuation hospital, the right leg was encased in a mid-thigh plaster cast, following which the patient was evacuated to the Zone of the Interior and admitted to a general hospital on April 10. At that time a sequestrectomy was performed on the right tibia, but since this procedure did not bring about satisfactory results, a thorough saucerization of the right tibia was carried out early in June. Approximately 3 weeks later, small, deep, pinch grafts were applied to the saucerized area with good results. In September the patient was transferred to the Cushing General Hospital for definitive treatment.

During his confinement, blood and serologic studies and urinalyses were reported as negative. X-ray films of the right lower leg showed a comminuted fracture of the mid-shaft of both bones, with loss of bone substance on the outer anterior surface of the tibia and with numerous, multiple foreign bodies in the soft tissues at the site of the fracture.

In early October the long leg cast on the right lower extremity, in which the patient had been admitted, was bivalved, and a small saucerized area was evident on the anterior aspect of the right leg at the level of the fracture site. At the upper end of the cavity, which was filled with small deep grafts, there was a small draining sinus. Since penicillin dressings were of no avail, on October 22, under intravenous anesthesia, the tibial wound was explored and saucerized, loose bone fragments removed and the area covered with a pressure dressing in which a catheter was incorporated for penicillin instillation. On October 31, under intravenous anesthesia, a dermatome graft was removed from the right thigh and sutured in position over the granulating area of the right tibia. Pressure dressings were applied. The postoperative

course was normal, the dressings being removed on the 10th day after operation when the skin graft was found to have taken well. Because of an unstable right ankle joint due to the destruction of many of the tendinous structures in the lower leg, on February 8 an intramedullary sliding type of ankle fusion was carried out on the right leg.

On February 13, following the ankle fusion, x-ray films revealed a sliding bone graft extending from the distal end of the tibia into the astragalus. Other bone detail was obscured by plaster. (During the following month x-ray study showed periosteal elevation along the shaft of the tibia beginning about 5 cm. proximal to the distal end of the shaft and extending upward for a distance of 23 cm.; associated with the changes were areas of decreased density from the cortex of the tibia that were consistent with bone destruction.)

On February 15 the cast was split because of extreme pain and swelling with cyanosis of the toes. The patient continued to run a moderately elevated temperature, and the wound was therefore inspected; a breakdown of the skin over the lateral malleolus, with purulent serous drainage, was found. Despite irrigation with 1 per cent sulfadiazine solution, the entire anterior aspect of the ankle joint broke down and drained profusely.

On February 20 streptomycin sensitivity reports on organisms cultured from the wound were recorded as follows: *A. aerogenes*, sensitive to 2 units per cubic centimeter; hemolytic *Staphylococcus aureus*, sensitive to 8 units per cubic centimeter; and beta-hemolytic streptococcus, sensitive to 32 units per cubic centimeter. During March, the blood plasma protein was 7.2 gm. per 100 cc. Subsequent cultures taken from the wound of the right leg during March were reported as showing *Ps. aeruginosa*, *A. aerogenes*, beta-hemolytic streptococcus and hemolytic *Staph. aureus*. On April 5 the *Ps. aeruginosa* was found to be resistant to 250 units and the hemolytic *Staph. aureus* sensitive to 0.5 units per cubic centimeter of streptomycin. On March 5 daily topical treatment of the wound with 15,000 units of streptomycin was begun. By March 21 the wound had become grossly clean, and the area of the tibia that had previously been exposed was covered with granulation tissue. On March 25 the wound was covered with a split-thickness graft taken from the left thigh, and a vaseline pressure dressing was applied. About 90 per cent of the graft was viable on the 10th postoperative day. During the following weeks a few pinch grafts were used to cover the remaining denuded areas. Two months later the wound remained well healed. The original fracture of the mid-tibia and fibula had healed without further treatment.

Although the results obtained in these 4 cases were gratifying, it should be emphasized that the evaluation of any method of therapy in cases of chronic osteomyelitis cannot be final until a period of years has elapsed, since in the past there has been recurrence in many cases that have been thought to have been "cured."

Incidentally, the discomfort of repeated injections was successfully alleviated by combining solutions of the drug with procaine.

Summary

Four cases of chronic osteomyelitis are presented, 3 of which were treated with combined intramuscular and local streptomycin therapy and 1 with local applications alone. An obvious advantage of the combined therapy is that such procedures as skin grafting and secondary closure can be carried out in a much shorter time. One is easily guided by the success of in vitro studies prior to using streptomycin. No toxic reactions were observed in this series.

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MEDICAL PROGRESS

PSYCHIATRY

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THE subject of psychiatry is discussed under the headings of leukotomy, shock therapy, neuropsychiatric disorders in veterans and psychiatric education.

LEUKOTOMY

During the past ten years surgical operations have been done on the frontal areas of the human brain in an attempt to relieve psychotic patients, as well as some patients with neurotic reactions, from symptoms that apparently were to be persistent and had not yielded to less drastic forms of treatment.

Egas Moniz,[1] in Portugal, was the first surgeon to undertake the operation that is now known as "prefrontal lobotomy," or "leukotomy," a better term in use in England. Moniz published his first results in 1936. Subsequently, Freeman and Watts[2,3] developed the procedure in the United States. Briefly, the technical purpose of the operation is to cut the white matter of the frontal regions from its connections with the thalamus — that is, to perform a section of the thalamofrontal pathway. Burr holes are made in both sides of the skull, at a point 3 cm. posterior to the lateral rim of the orbit (anterior margin) and 6 cm. above the zygomatic process. Through the burr holes a leukotome is introduced, and section of the frontal white matter in both hemispheres is accomplished with this instrument. The cortex is not cut except in a small area for the introduction of the leukotome. The operation is done in the plane of the coronal suture. The technic has been described in detail by Freeman and Watts.[2]

Why patients benefit at all and to the extent that they do from this heroic operation is still basically a subject for speculation and for further neuroanatomic and neurophysiologic research. Freeman and Watts[3] state:

> . . . the frontal lobes subserve the functions of foresight and insight, particularly as related to the self. It is in relation to these ego functions that the effective coloring supplied by the thalamus is of overwhelming importance for the adjustment of the individual in his social milieu.

Their theories are given special consideration in a recent monograph.[4] Cobb,[5] who questions the assumption that the frontal areas of the brain are alone the centers for insight and foresight, presents evidence that leukotomy reduces only quantitatively the neural mechanism for the associative functions.

Whatever the reasons, if the operation is successful, the emotional intensity and coloring of the ideas, hallucinations or somatic sensations that have plagued the patient subside to an innocuous level, and in some cases the symptoms themselves eventually disappear entirely. In other words, the effect of a successful leukotomy is to take the emotional wind out of the sails of the psychotic process. Severing the thalamofrontal radiations seems to do this. Although the operation is standardized in certain respects, the desired clinical result may depend, in the individual case, on whether the plane of section is precisely in line with the coronal suture or a number of millimeters posterior to it. In this regard, Freeman and Watts[3] write as follows:

> . . . hypochondriasis and fixation of visceral complaints in involutional depressions have been satisfactorily overcome by a standard operative procedure, but a severe obsessive compulsive neurosis of long duration may require incisions from 5 to 7 mm. posterior to the plane of the coronal suture. Long-standing schizophrenia requires the maximum operation. In such cases we usually operate from above, through burr holes 10 to 15 mm. behind the coronal suture and 4 cm. from the midline. . . .

Another, and most important, point is that the more posterior the plane of section, the less likely it is that the patient will be able to make an even partially adequate social readaptation. Freeman and Watts[3] state:

> . . . in order to obtain satisfactory results sufficient fibers must be severed in order to reduce the emotional component of the psychosis to the point where the ideas no longer dominate the behavior of the patient, yet the incisions must leave sufficient quantities of the frontal lobes in order to permit the patient to make a satisfactory adaptation in a social environment. Every millimeter that the incisions trespass upon the area posterior to the plane of the coronal suture renders this adaptation less complete and more difficult.

On this fundamental issue, these authors were enabled, by multiple operations, to form some opinions, and the search for the ideal plane of section was continued.

In the successful cases, unfortunately, the patient is not benefited to the point of complete cure. If he has lost, or practically lost, his psychosis, he has paid for it with more or less profound changes in his premorbid personality. Kindwall and Cleveland[6] point out that, although happier and easier to live with, the patient is not so able or complete a person as he was before his illness. Frank[7] summarizes the situation as follows:

> The fundamental personality pattern remains unchanged after leucotomy; it has less legend only. The emotional

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short-circuiting in a previously colourful personality certainly is preferable to an incurable psychotic misery.

It is generally agreed that the operation leaves the patient with a definite loss of initiative and a shallowness of affect. Other symptoms or tendencies, persistent in a large percentage of cases, include euphoria, procrastination, facetiousness, increased appetite, laziness and tactlessness.[4] This rather alarming list of characteristics does not, however, prevent many patients from carrying on with work. Berliner et al.[8] describe a woman, a librarian, who was not able to do simple work in the hospital library a few months after her operation because her powers of retention were greatly impaired. Three months later, however, she took a job in a public library, where she had worked satisfactorily for eighteen months at the time of the report.

Freeman and Watts[2] present the following description of the results of leukotomy:

> Patients who have made a satisfactory recovery . . . are far from inanimate clods. They are cheerful, friendly, uncomplaining, outspoken, buoyant, for the most part. They fall in with the mood of their companions, are quick to follow suggestions and are not embarrassed, glum or self-conscious. They take an active interest in everything that goes on about them, read the papers, attend movies, work regularly and play games with intelligence and foresight. With them the emotional component of foresight and insight is sufficient for meeting external situations of moderate complexity . . . many patients have a more or less complete amnesia for the whole psychotic period. . . .

Hofstatter and his associates[9] report that, at the time of writing, 14 in a series of 100 patients who underwent leukotomy were regularly employed, 4 of them for the first time in their lives. Another 12 were carrying the full responsibility of housekeeping.

The question of a permanent deficit in intellectual functions following leukotomy has not had thorough study because of the lack, in general, of premorbid data on these capacities in the patients concerned. Hofstatter et al.[9] state that the intellectual assets were not diminished in their cases. Frank[7] observes that in a series of 200 cases, except for 16 patients over fifty-five years of age, no impairment of cognition or intellectual deficit was observed a year after the operation. Halstead, Carmichael and Bucy[10] developed a battery of tests designed for assessing the so-called "biologic intelligence." This term, in contrast to the standardized psychometric tests, is explained as follows:

> Psychiatry, and for that matter the whole field of biology, has long felt the need for a conception of intelligence more closely related to the clinically observed capacities of the individual for general adaptive behavior.

The tests were given to 8 carefully selected patients before and after prefrontal lobotomy. The guarded conclusions of the authors were that the biologic intelligence, as reflected by an impairment index, did not appear to be altered significantly by prefrontal lobotomy, and that little is known concerning the behavioral effects of this operation.

The best results from leukotomy are obtained in the long-standing depressions, particularly of the involutional and agitated types, in obsessive-ruminative-tension states and in certain types of schizophrenia. The more the patient is tense, anxious, emotionally disturbed, the more he is, in effect, fighting his disease, and the better are the chances of relief by this operation. Frank[7] considers the indications for leukotomy strongest in patients with a colorful personality, beneath whose psychotic symptoms a depth of emotional response can be discerned. The first 75 of his 200 cases were selected exclusively because of distressing and permanently disturbing hallucinations, unmanageable aggressiveness, unceasing melancholic agitation, constant unrelieved anxiety due to delusional experiences or organ sensations. In schizophrenia, the catatonic and paranoid types seem to respond better than the hebephrenic and simplex. Apathy, lack of affect, emotional blunting and paucity of delusional productivity are generally unfavorable indications prognostically, in contrast to tension, overactivity, storminess and richness of delusional material.

It is hardly necessary to remark that organic deterioration of the brain, as in cerebral arteriosclerosis and senile degenerative processes, is a contraindication to leukotomy.

The usual postoperative and convalescent complications in the eventually successful cases are confusion, restlessness, epileptiform convulsions, urinary frequency and incontinence. On the average these clear away within a few weeks to less than a year. The operative mortality is generally reported as being less than 3 per cent.

Social re-education, in the directions of guidance and support, are emphasized by Frank[7] and by Berliner et al.[8] as being of critical importance for the postoperative patient. Berliner and his associates regard re-education as especially valuable for patients who have been out of contact with reality for long periods, in whom every effort should be made to prevent a renewal of schizophrenic habits; early discharge is advised only if home conditions are particularly favorable. Frank is not referring only to the schizophrenic invalid in the following statement:

> In psychotics who have nobody to look after them outside the hospital, or whose families during the many years of illness have lost interest and sympathy for them, or whose environmental circumstances are decidedly unfavourable emotionally or materially, leucotomy is of questionable value. If one neglects the above-mentioned factors, apparently good clinical recoveries will, in the end, be disappointing.

What is considered a successful case? What is meant by "social recovery," "much improved" and "improved"? In general, authors classify patients as socially recovered or much improved if they are able to leave the hospital and to approach, at least,

their former social and occupational levels. A full social recovery indicates that, after varying periods of surveillance at home, the patients conduct themselves independently, manage their own affairs and carry on with useful work in a manner that is either comparable with former standards or not necessarily equal to them. Insight into the illness is not included. "Improved" means that the patient may or may not have left the hospital, may do some simple work and is generally much less of a nursing problem than before operation.

In Frank's[7] series of 200 cases, 84 (42 per cent) were considered social recoveries, and 57 (29 per cent) improved. The types of illness comprised schizophrenia, paraphrenia, paranoia, cyclothymia, involutional depression and chronic obsessional neurosis. The average time of observation, following operation, was fifteen months, and the range was nine months to three years. In the 100 cases reported by Hofstatter et al.,[9] of 66 schizophrenic patients, 18 were much improved, 24 improved and 20 slightly improved; of 16 manic-depressive patients, 9 were much improved, 4 improved and 3 slightly improved; of 6 psychoneurotic patients, 5 were much improved, and 1 improved. All the patients were studied carefully for at least one year, 37 for more than two years, and 10 for more than three years. Freeman and Watts,[11] in a report on 50 schizophrenic patients followed for two to seven years after leukotomy, observed the following results: employed, 16 patients; keeping house, 4; studying or employed part time, 6; at home, 15; and in institutions, 9.

Over-all statistics generally indicate that at least some degree of improvement is the result, for the period of observation, in well over 50 per cent of cases after leukotomy.

From this brief outline of the procedure and application of leukotomy, it is obvious that the operation is one of amelioration, not cure. It should be, and supposedly is, limited to certain patients who are, on the whole, wrecks of human nature. With the patient who is apparently constitutionally subject to manic-depressive reactions of great sweep and intensity, the operation should not be performed until it is as certainly established as possible that periods of remission can no longer be expected. With the adolescent or young person who develops what appears to be a schizophrenic psychosis, the operation should not be done hastily, as though to save him from inevitable deterioration, since there is good evidence that some persons pass through, in biologic development, a span that seems to have the earmarks of a devastating process. On the other hand, although leukotomy is but a few years old, it seems to be the step by which some chronic mental invalids may attain contentment and freedom from harassment that otherwise they could not have.

Shock Therapy

As is well known, insulin coma and electric shock do not provide a permanent cure for psychoses. The value of electric shock in terminating psychotic episodes in the affective disorders, however, is well established. Also, in some forms of schizophrenia, there is evidence that insulin treatment may effect remissions that might not otherwise occur or bring them about sooner and thus shorten the period of hospitalization.

Electric shock is far less effective in schizophrenia than it is in involutional depression and in both the manic and depressed phases of the manic-depressive psychosis. Yet its successful use is reported in acute excitement and catatonia.[12, 13]

In spite of the most gratifying and striking results in many cases of depression, it is still to be proved that an indefinite number of electric shocks produce no permanent damage to the brain. Bennett[12] states that although there is no conclusive evidence of permanent brain damage, the total number of shocks that may safely be given is not clear. So far as the partial memory defect that, more frequently than not, accompanies a series of shock treatments is concerned, Lewis[14] remarks that some patients do not regain their complete memory after many months and asks if it is possible that some never attain their original faculty.

There are no published data, so far as I know, on the correlation between the permissible number of electric-shock treatments and the probability of a lasting memory defect. It seems that such data could never be accurately collected, since there is a wide variation in original, individual memory capacity. In any event the suffering to be endured by the deeply depressed patient and the danger of suicide, as well as the social, domestic and economic ramifications, justify an initial series of five to fifteen treatments.

An interesting and sometimes important consideration is the development of mental illness during pregnancy. If, for some reason, therapeutic abortion is excluded, should shock therapy be tried? There are few reports in the literature on this question. Gralnick[15] reports 2 cases, in 1 of which a thirty-two-year-old woman was given insulin-coma treatment during the second and third months of pregnancy; she apparently recovered from the illness before term but delivered a macerated fetus. The other patient, who was thirty-one years old, was given both insulin and electric shock, between the first and fifth months of pregnancy, with no improvement, and also gave birth to a macerated fetus.

On the other hand, Bennett[16] reports the successful treatment, with electric shock, of a number of women in all stages of pregnancy up to within two weeks of delivery, without incident to the pregnancy. He cites an article by Polatin and Hoch, who gave

five shocks to a patient almost four months pregnant and ten shocks to one who was seven months pregnant, without premature labor or apparent damage to the mother or the child. Gralnick[15] speculates whether hypoglycemia from insulin treatment caused some maldevelopment in the fetus, resulting in stillbirth.

It seems clear that, to date, there has not been enough experience with this problem to allow any general conclusions. Although Bennett does not state how many pregnant women he has successfully treated, the impression given by the reports discussed above is that electric shock may be a safer therapy than insulin for psychoses during gestation.

Neuropsychiatric Disorders in Veterans

Although insufficient time has passed to approach the perhaps impossible problem of relating military service to the development or continuation of psychiatric disorders in the veterans of World War II, there are a few suggestions that some observers were overly alarmed in predicting a high incidence of maladjustment in the men who were in military service. In a study of 10,000 veterans, said to be representative of the bulk of the Army, Burton, Eaton and McMahan[17] found only 257 men, or 2.57 per cent, who warranted a neuropsychiatric diagnosis. The men had been discharged through a separation center and thus did not include soldiers who were already in hospitals for mental or physical disability. The ages ranged from twenty to thirty-five years. Most of them had been in combat or had been overseas and had had three or more years of service. In what percentage and to what extent, since separation, these men have or will become maladjusted, of course, could not be answered by the authors.

One of their impressions is that the Army Medical Corps has done well in establishing a friendly attitude on the part of the soldier toward psychiatry: "These men no longer feel that only a 'psycho' sees the psychiatrist. From the experience gained here where several hundred thousands of men have been seen, there is no doubt that the psychiatrist has been accepted whole-heartedly." (I trust that this is so and that there can be no substantiation to the passing thought that men about to return to civilian life may well be exuberantly cordial to anybody.)

It has been remarked again and again that difficulty in adaptation to military life does not indicate an inherent incapacity for adjustment to the conditions of a more usual social pattern. In a follow-up study of 6000 men discharged from the Army in 1943 for psychoneurosis, Brill, Tate and Menninger[18] estimated that 86 per cent were working full or part time. Of these men, 75 per cent had seen physicians one or more times since discharge, and at the time of induction 51 per cent of them had considered their health none too good.

To date, according to most reports in the psychiatric literature, the person of average good integration has withstood the trials and shocks of military service without resultant chronic invalidism from psychiatric causes, and there is no convincing proof that human adaptability is on the wane.

Psychiatric Education

Psychiatry is not properly taught in most medical schools, including the best. Through generations of medical students the subject has been considered a questionable branch of medicine, if it was considered long enough to give it even that classification. It certainly did not usually attract anyone except "screw balls," and probably the men who taught it were a little on the "screwbally" side. The recent war has changed this estimation to some extent, on the part not only of medical students but also of the public generally. Even before the war psychiatry was considered, in some quarters, with a little less disdain. For some years it has been so interestingly presented at University of Colorado School of Medicine that students have spontaneously taken the elective courses. With the progress of the war, the large number of men rejected from service for neuropsychiatric disability and the considerable incidence of psychiatric disorders among both men in training and men in combat areas drew, as never before, the attention of the medical profession and the public to psychiatry. Many physicians who were not psychiatrists during their service with the armed forces were brought face to face more arrestingly and convincingly than ever in civilian practice with the reality of psychogenic factors in physical disability and symptom formation.

In consequence of this sharper focus and in anticipation of an admitted need or demand on the part of many veterans for psychiatric treatment, a group of prominent psychiatrists, internists and medical educators were brought together in Hershey, Pennsylvania, in February, 1945, by the National Committee for Mental Hygiene and the Commonwealth Fund. A summary of the discussions and the recommendations of this meeting are interestingly presented in a pamphlet.[19]

One of the recommendations, in part, was that physicians engaged in the practice of general medicine need education on the neuroses and their care and that an experimental course, or courses, at the postgraduate level should therefore be set up promptly to develop content and methods for such education; the need for a nationwide program, in the light of such experiments, was expressed. A beginning has been made in carrying out this recommendation. For two weeks in April, 1946, twenty-five physicians attended a postgraduate course called

"Psychotherapy in General Practice" at the University of Minnesota. The course was arranged by the Commonwealth Fund and the Division of Postgraduate Education of the university. The plans, procedure and immediate results of this undertaking have been recorded by Smith.[20]

A reading of Smith's pamphlet gives the impression that the student doctors and the teachers considered the course a striking success. One of the former, a recent graduate of an excellent school, is quoted as calling the program "the most remarkable educational experience I have ever had." The course comprised lectures, section meetings, seminars, films, clinics and individual interviews with patients.

Since about 50 per cent of the patients who consult the general practitioner have complaints for which there is no discoverable physical or organic cause, it is deplorable that medical education is so derelict that otherwise competent physicians do not know what to do for such patients except to make them worse or to help them speciously and temporarily by such a statement as "There is nothing wrong with you" or by resorting to a "pill," the trust in which has, in large part, been engendered by the medical profession. It would be beneficial if such a course as that offered at the University of Minnesota could be given throughout the country, within availability for all physicians who need it.

One of the instructors in the Minnesota course stated that the overall purpose of the course was to sensitize doctors to emotional problems in their medical practice. The principal defects in the teaching of psychiatry and clinical medicine are that the immediate and pervasive effects of emotion are not delineated and stressed — for example, that diarrhea or palpitation may mean anxiety and not enteritis or heart disease — and that the student does not learn the profound importance of giving the patient enough time to talk to the point, at least, of assurance that the physician is interested in him as a human being or, in other words, that the doctor listens with genuine, not feigned, interest.

Psychiatry is not limited to the care and treatment of the psychoses. Of equal importance are the study and treatment of personality problems and the consequent emotional reactions. Therapy is most successful when it is in the hands of a physician who is sincerely interested in his patients and who gives the patients enough time and intelligent attention to work out the problems if they are possible of solution.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

BENJAMIN CASTLEMAN, M.D., *Associate Editor*

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CASE 33091

PRESENTATION OF CASE

A fifty-three-year-old retired general entered the hospital because of intermittent pain in the abdomen and back.

The patient was known to have had hypertension for seven years and had recently been following a "rice and fruit" diet. Six months before entry he began having episodes of "indigestion," with epigastric pain and gaseous discomfort sometimes accompanied by vomiting of recently eaten food. Usually, these episodes, which numbered five in all, followed meals that had exceeded the dietary restrictions. He then remained well until five and a half weeks before entry, when he suddenly began to have sharp pain in the lower chest radiating from "the pit of the stomach" down to the toes and "stiffening" him out. For about forty-five minutes the legs were paralyzed. He was unable to move his toes, turn his feet or bend his knees, but he could roll his hips. The pain persisted until a hypodermic injection relieved him two hours later. By that time the "paralysis" had completely disappeared. During that episode the patient was nauseated and vomited several times. For the next two weeks he continued to have pains in the lower abdomen, occasionally radiating to the epigastrium. He also ran a low-grade fever and developed a stubborn constipation, relieved only by enema. The patient's wife thought that he was slightly jaundiced for a while and that his bowel movements were lighter than usual but that they quickly returned to normal. The pain gradually receded, and the patient felt better again. Two weeks before entry he developed a "twisting" pain between the shoulder blades when he assumed certain positions. Five days later x-ray examination of the chest revealed a left pleural effusion and "congestion of the lungs." At that time 350 cc. of bloody pleural fluid was removed. Seven days before entry a Graham test showed nonfilling of the gall bladder; there were no stones. Another thoracentesis yielded 400 cc. of similar fluid. In the interval between the two thoracenteses the patient had developed pain in the left side of the chest and also had a slight nonproductive cough.

The patient denied having had any chronic cough, dyspnea, orthopnea or hemoptysis.

Physical examination revealed a well developed man in no distress. Over the entire lower left side of the chest there were diminished breath sounds, diminished tactile and vocal fremitus and dullness. Over the left thoracic paravertebral area there was a loud, rushing bruit synchronous with the peripheral pulse. The heart was normal. There was some pain at the site of an old appendectomy scar in the right lower quadrant. Otherwise, the abdomen was negative. The left knee jerk was not obtained; the right was normal. One observer thought that the pulse in the left dorsalis pedis artery was less than that in the right. The femoral and posterior tibial pulses were equal.

The temperature was 98.8°F., the pulse 85, and the respirations 20. The blood pressure was 170 systolic, 100 diastolic.

Examination of the blood disclosed a hemoglobin of 12.2 gm. and a white-cell count of 10,700, with 76 per cent neutrophils and 6 per cent eosinophils. The serum protein was 6.2 gm. per 100 cc. The van den Bergh test was normal. The prothrombin time was 19 seconds (normal, 14 seconds). A blood Hinton test was negative. The urine was normal. An electrocardiogram revealed a normal rhythm at a rate of 80 and a PR interval of 0.18 second. The T waves were inverted in Lead 1 and low in Lead 2, with a sagging ST segment, and upright in Lead 3. The chest leads showed an upright T wave in Lead CF_2, a flat T wave in Lead CF_4 and an inverted T wave in Lead CF_5. There was a slight left-axis deviation.

X-ray examination of the chest revealed a rounded mass about 8 cm. in diameter lying in the left superior mediastinum somewhat posteriorly (Fig. 1). The mass could not be distinguished from the aorta. There was no definite displacement of the mediastinum or esophagus, but the mass compressed the trachea. A considerable amount of fluid was present in the left pleural cavity, particularly along the mediastinum and posteriorly. The right lung field was clear. The heart was at the upper limits of normal, but its exact size could not be definitely determined. Both leaves of the diaphragm moved equally.

During the second night in the hospital the patient had another attack of epigastric pain, severe enough to require Demerol sedation. This episode was not accompanied by vomiting. On the next morning the abdomen was soft, and no masses were felt. There was some residual tenderness in the epigastrium. The bowel movements had become normal without the use of laxatives. On the eighth hospital day a thoracentesis was performed in the eighth interspace in the posterior axillary line, and 1000 cc. of clear, yellow fluid was withdrawn. X-ray examination of the chest repeated after this procedure showed a shadow through the previously noted mass.

This mass was interpreted as being the descending aorta or fluid in the medial portion of the pleural cavity. There was no definite erosion or destruction of bone. Following the pleural tap, the patient had a mild chest pain for several days. On the sixteenth hospital day, he began to complain of a sense of substernal pressure and small "stabbing pains" in the chest. Another chest film on the nineteenth hospital day showed little change except possibly a slight decrease in the amount of pleural fluid.

On the twentieth hospital day just after lunch the patient coughed up a small amount of bright-red

FIGURE 1.

blood (enough to stain six Kleenex tissues). He had no pain. The physical findings at that time were unchanged except for a moderately loud apical systolic murmur that had not been heard previously. Fifteen minutes later the patient complained of a sudden, severe, crushing pain in the left side of the chest. He rapidly became white, clammy and restless. The blood pressure fell to 60 systolic, 40 diastolic. The breath sounds were diminished over the entire left side of the chest, and there was dullness in the posterior axilla. He was placed on shock blocks and given oxygen by Boothby mask, as well as 1000 cc. of whole blood. The blood pressure returned to 130 systolic, 80 diastolic, and his condition remained satisfactory for twelve hours. On the following morning he again coughed up a small amount of bright-red blood and complained of severe pain in the center of the chest and of inability to breathe. He became restless, pale and sweating and died within thirty minutes.

DIFFERENTIAL DIAGNOSIS

DR. WALTER BAUER: Could the electrocardiographic changes have been due to hypertension? Or must one assume the presence of coronary heart disease?

DR. EDWARD F. BLAND: The changes were consistent with hypertension.

DR. BAUER: May I have some help on the x-ray films, Dr. Schatzki?

DR. RICHARD SCHATZKI: I think that everything is described in the record. Something was said about a shadow that showed through the mass.

DR. BAUER: Yes; following the aspiration of 1000 cc. of fluid.

DR. SCHATZKI: The word "mass" was used in the sense of something that occupies space.

DR. BAUER: I did not understand the statement.

DR. SCHATZKI: This is the mass mentioned in the record. I do not see another shadow in that region.

DR. BAUER: Is it compatible with an aneurysm of the aorta?

DR. SCHATZKI: Yes.

DR. BAUER: Were there any pulsations during fluoroscopy?

DR. SCHATZKI: I do not believe so.

DR. BAUER: I must admit that when I first read the history my immediate reaction was that this patient had an aortic dissecting aneurysm. As I read on, however, I wondered whether all the findings could be explained satisfactorily on this basis. I did not believe that any type of mediastinal tumor, benign or malignant, could account for the sequence of events as recorded. I wondered somewhat about the possibility of a mediastinal abscess, but again there seemed little to justify or lend support to such an interpretation. Prior to seeing the x-ray films, I considered syphilitic aneurysm or a dissecting aneurysm of the aorta as the likeliest diagnostic possibility. From the record alone I was inclined to favor an aneurysm that had first dissected downward and subsequently upward. I must admit, however, that I found it difficult to account for the pleural effusion. I was not aware of the fact that a dissecting aneurysm could leak without being fatal. Having seen the x-ray films, I favor the diagnosis of an aortic aneurysm. I assume that it leaked for a time five and a half weeks prior to entry and finally ruptured, causing death. I am not certain that this diagnosis explains all the findings — for example, the two aspirations of bloody pleural fluid and a third that was yellow. There are a few other discrepancies. In favor of syphilitic aneurysm, however, were the x-ray findings, the bruit and the absent knee jerk on the left. True enough, the blood Hinton reaction was negative. The evidence in favor of syphilis is as complete as one might like.

DR. BENJAMIN CASTLEMAN: Do you believe that this was a saccular aneurysm rather than a dissecting one?

DR. BAUER: Yes; I do not believe that a dissecting aneurysm ever reaches this size, but I may be expressing my ignorance of dissecting aneurysm.

DR. BLAND: If Dr. Bauer does not ask me about the bloody fluid in the chest, I should like to ask him what sort of mass in the chest other than dissecting aneurysm involves the aorta and gives a sudden pain in the pit of the stomach, radiating down to both toes, with partial paralysis.

DR. BAUER: On the way to this conference I asked Dr. Bland if a syphilitic aneurysm ever dissected, and he said, "Yes; Dr. Soma Weiss* reported three such cases." If such an event had taken place it could account for the initial attack of pain. I must admit that when I read the record over last night I thought that this man had a dissecting aneurysm, and my reason for retracting this diagnosis is largely on the basis of size. On the other hand, I did not realize that a dissecting aneurysm could leak as it supposedly did during the first attack and not be fatal. This may be the first example, of course.

DR. BLAND: I am afraid that Dr. Bauer misunderstood me. The cases Dr. Weiss demonstrated and reported had two processes in the same aorta: syphilis and media necrosis. The latter — not the syphilitic aortitis — was the cause of the dissection. That might be the explanation of the onset of pain, radiating down the legs, and the partial paralysis.

DR. BAUER: I wonder whether it was actual paralysis or inability to move the legs because of pain.

DR. CASTLEMAN: Will you tell us what you know about this patient, Dr. Leech?

DR. CLIFTON B. LEECH (Providence, Rhode Island): I was responsible for this patient before he entered the hospital. I should be much happier about appearing here if my self-esteem were at a higher ebb than it is right now on account of the dimness of my perception in this case. But I am not here to make excuses for my failure, but to give a few reasons that contributed to that failure.

I had been responsible for this man since 1940, when fluoroscopy disclosed none of the abnormalities seen in the present x-ray films. The impression that I got from the patient during his recent acute attack was rather different from what appears in the abstract. I did not see him at 2 o'clock in the morning, when he had the sudden attack, because a nearby physician was called in to give a hypodermic injection, but I did see him at 10 o'clock that morning. He did not appear seriously ill. The pain was not in the chest entirely; it was largely abdominal, with some chest pain, as in the few attacks that he had had in the previous few months and that had cleared up within a few hours. This pain persisted. Regarding the paralysis in the leg, he mentioned that for a little while he could not move the left leg. He said, "My left leg was paralyzed." I did not find anything the matter with the leg, and paid no particular attention to it. The patient went on for several days with no complaint aside from the pain, which was chiefly epigastric and more or less generalized. He could not move his bowels although he had the urge. The first of several enemas produced a little feces but after that none. At the end of five days I called a surgical consultant. I believed that the patient had a partial intestinal obstruction or partial ileus. The surgeon had no doubt about the diagnosis of acute

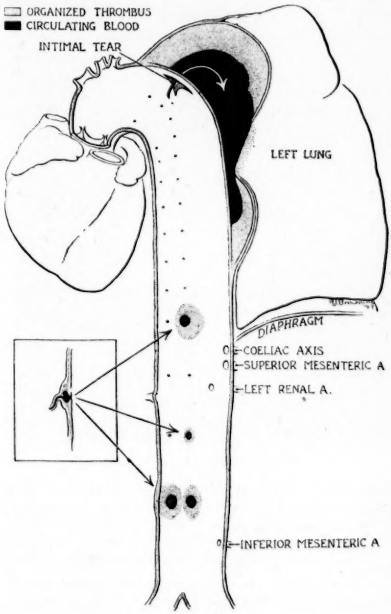

FIGURE 2.

cholecystitis, which I accepted. The patient continued for a week with the same symptoms. At no time did he complain of discomfort in the chest. The blood pressure during the periods of pain had risen to unprecedented heights for him — 216 systolic, 160 diastolic. I took it two or three times when he did not have pain, and perhaps as a result of morphine, it was down to 180 systolic, 100 diastolic. I thought that this was a peculiar course for acute cholecystitis and asked the surgeon to see the patient again. He saw no reason to change the diagnosis and postponed surgical treatment until the patient was well enough to have x-ray studies of the gall bladder. At that time I am sure that the patient had no fluid in the chest.

During the x-ray study of the gall bladder, the roentgenologist stated that there was fluid through-

*Weiss, S. Clinical course of spontaneous dissecting aneurysm of aorta. *M. Clin. North America* 18:1117-1141, 1935.

out the chest. The signs of fluid were unmistakable. I had questioned the patient closely about chest symptoms, and he said that he had a little pain between the shoulder blades if he moved in a certain way. Paracentesis yielded 350 cc. of uniformly bloody, almost ruby-red fluid. My thought was that in addition to the hypertension and acute cholecystitis he had a mediastinal tumor with pleural involvement, and I had no hesitancy in allowing him to go back to the roentgenologist's office for completion of the studies, which were reported to me as showing a large left superior mediastinal mass, with pleural fluid, and a nonfunctioning gall bladder.

Two days after the first chest tap I again removed 400 cc. of uniformly bloody fluid. For the first time the patient admitted discomfort in the area of the tap. I accepted the roentgenologist's diagnosis and made arrangements for him to come up to see Dr. Churchill. Although the record does not so state, he had a third attack two days before he came here. He also had a small amount of bloody fluid at that time.

A PHYSICIAN: Was he jaundiced at that time?

DR. LEECH: No.

DR. BAUER: I should like to go back to my first diagnosis — a dissecting aneurysm of the aorta.

CLINICAL DIAGNOSIS

Dissecting aortic aneurysm, with rupture.

DR. BAUER'S DIAGNOSIS

Dissecting aneurysm of aorta, with rupture.

ANATOMICAL DIAGNOSIS

Dissecting aneurysm of aorta, with rupture into left pleural cavity and with localized expansion and partial healing.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: At autopsy the left pleural cavity contained almost 3000 cc. of blood. The source of this blood was a ruptured aortic dissecting aneurysm (Fig. 2). The intimal tear was located just beyond the arch, at the beginning of the descending thoracic portion. It was a triangular tear leading into a large sac, 8 cm. in diameter, that was lined with partially organized clot and filled with fresh blood. This sac was really a greatly expanded portion of the dissecting aneurysm, or what might be termed a medial hematoma, because it is within the media that dissection always occurs. It produced the large mediastinal shadow observed on x-ray examination. Farther down the aorta we found another similar but smaller medial expansion that was almost completely filled with organized clot and a little fresh blood. These two sacs were connected. Following the aorta down still farther we found dissection as far as the iliac arteries. This portion of the dissection, however, was organized, measuring at the most 1 mm. in width. A similar healed dissection extended proximally from the intimal tear down to the aortic valve. It did not appear to involve the coronary mouths. There was evidence of some dissection around the mouth of the right renal artery and especially around several of the lower intercostal arteries, where there were localized expansions within the aortic wall measuring up to 1 cm. in diameter. These were undoubtedly the cause of the transient leg paralysis, since the intercostal arteries supply branches to the spinal cord.

I believe that the sequence of events was as follows. The intimal tear and dissection occurred five and a half weeks before entry. Most of the blood in the aneurysm organized, leading to obliteration of the channel, except in the region of the intimal tear, where the localized medial hematoma increased gradually in size until the pressure was so great that the external wall gave way There probably was a slow oozing of blood through this sac, which would account for the hemorrhagic pleural fluid removed by Dr. Leech two or three times. If clear fluid was obtained, I believe that the blood had settled and that this was supernatant fluid above the blood clot.

A PHYSICIAN: Why did the patient have a hemoptysis?

DR. CASTLEMAN: The aneurysm was adherent to the left upper lobe, and there was a little oozing of blood into the lung parenchyma.

There was no evidence of syphilis. This was a case of media necrosis aortica cystica. We have had one other case of aortic dissection with a large medial hematoma such as this.

CASE 33092

PRESENTATION OF CASE

A seventeen-year-old unmarried salesgirl was admitted to the hospital because of a painless mass in the jaw.

About three months before entry the patient noted a hard 2-cm. mass, which seemed poorly attached to the jawbone on the right. A physician thought that it was a "gland" and gave her pills. When it did not regress he attempted incision and drainage but obtained only blood. About a month later, when the left lower incisor teeth began to ache, the patient was referred to a dentist for x-ray studies. Three weeks later the swelling had enlarged; the right jaw had begun to ache, but an x-ray film was not remarkable. A repeat x-ray examination ten days later revealed extreme destruction originating within the right side of the mandible and extending to include the symphysis. A week before entry numbness developed in the right chin and lower lip.

Physical examination revealed a symmetrically enlarged, hard, insensitive mass about the size of a pear jutting from the chin (Fig. 1). It was continuous with the mandible and lay immediately beneath the dusky tense skin, presenting inside the

mouth floor and elevating the tongue. There was an area of anesthesia, about 3.5 cm. in diameter, at the angle of the mouth on the right.

The routine admission laboratory findings were normal. The blood calcium was 9.2 mg., and the phosphorus 4.2 mg. per 100 cc., and the phosphatase 4.0 Bodansky units.

An x-ray film taken in the Tumor Clinic just before admission revealed a large soft-tissue mass arising from the chin and protruding slightly to the left side (Fig. 2). The anterior aspect of the jaw on both sides, as well as in the region of the chin, showed extensive bone destruction involving the lower two thirds of the jaw. The destructive process had caused the isolation of several bone fragments. No calcification was seen in the soft-tissue mass, and no evidence of periosteal activity was present. An x-ray film of the mandible and of the upper cervical spine taken two days after admission revealed bone destruction as far as the second molar area, with involvement of several teeth.

On the fourth hospital day an operation was performed.

Differential Diagnosis

Dr. Henry M. Goldman: As can be seen from a photograph of this girl, the tumor had grown to a considerable size before admission.

The history states that the patient had a painless mass poorly attached to the jawbone on the right side. The fact that the mass was poorly attached

Figure 1.

to the jawbone suggested to her physician that it was an inflammatory "gland," and he gave her some pills. The mass did not regress, however, and on an attempt to drain it, only blood was recovered. One can assume that a tumor already existed and that the "gland" was a part of the lesion. The fact that the patient had pain around the teeth a month later seems to denote that the tumor had invaded the body of the mandible and had involved the periapical region of one or more teeth. This tooth or those teeth were probably loose, a finding that is often the first evidence of a malignant lesion of the jaw. The x-ray film taken at that time was described as "not remarkable." I highly question this because there must have been some change, since a film taken ten days later showed extensive destruction of the mandible. This brings up two possibilities: in the first place, the tumor may have invaded along the mandibular canal, causing extensive destruction in a short time; and secondly, extensive invasion may have taken place because of a highly malignant tumor. The patient developed numbness of

Figure 2.

the right chin and the lower lip, which reinforces the suspicion that the tumor had invaded the mandibular canal and had involved the inferior mandibular nerve.

Reviewing the history up to this point, I believe that the tumor was originally periosteal or endosteal and later extended peripherally and internally.

The blood studies were negative and rule out any of the skeletal diseases.

X-ray examination showed an osteolytic process involving the middle portion of the mandible and appearing as spotty irregular radiolucent areas. A large, soft-tissue mass was seen extending from the jaw; no calcification was observed in the soft tissues and no periosteal activity was present.

In summarizing the history, one can say that this was not an inflammatory lesion. This rules out an osteomyelitis or anything of that nature. We know that this was a rapidly growing, invasive tumor and therefore a highly malignant one.

The first thing to think of is an osteolytic osteogenic sarcoma, with which the patient's age and the roentgenologic evidence are consistent, and on the law of chance that is a reasonable diagnosis to make.

A periosteal fibrosarcoma is suggested by the fact that the mass started in either the periosteum or the endosteum. The patient was in the correct age group for this tumor also. The lack of osteoblastic activity in the x-ray film makes me lean toward a fibrosarcoma. I think that a Ewing tumor should also be considered — the age is again right. The

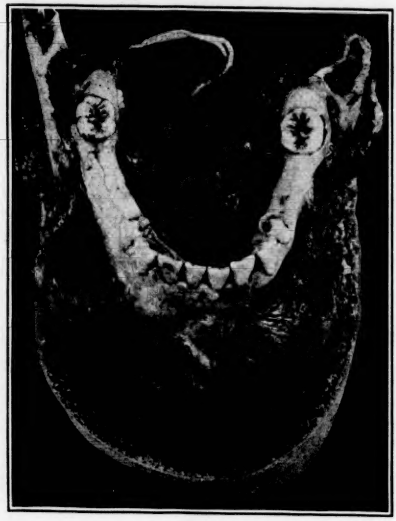

FIGURE 3.

history does not mention any injury or blow, but that is a possibility. There was no history or x-ray evidence of multiple myeloma; since this was a solitary lesion and did not run the course of myeloma, I shall dismiss that diagnosis. I also thought of a neurogenic fibrosarcoma, for which I think the possibilities are good, an angiosarcoma and finally a metastatic tumor. This could have been a metastatic tumor from a primary tumor in some other area — a kidney tumor, for instance. That is not too rare. I think that that possibility should definitely be considered.

Going through such a differential diagnosis, one comes down to a preoperative diagnosis of either osteogenic sarcoma or periosteal fibrosarcoma. I finally concluded that it was a highly malignant tumor that had probably metastasized and should have been resected immediately and that it was a periosteal fibrosarcoma.

DR. JAMES R. LINGLEY: The tumor is adequately visualized in this lateral view, which shows a mass within the jaw. There is no calcification. The lesion is predominantly destructive. The only new bone is anteriorly, with a little periosteal malformation. The process involves more of the right side than the left.

DR. JOSEPH C. AUB: Do you have the x-ray films taken ten days previously?

DR. TRACY B. MALLORY: They were taken in another hospital, and we were not able to get them.

DR. AUB: It is hardly likely that they were normal.

DR. MALLORY: We all agree on that. Do you wish to express an opinion, Dr. Sosman?

DR. MERRILL C. SOSMAN: The lesion looks purely destructive. There is no obvious new-bone formation, and no reactive bone, such as one might expect with an inflammatory process. The only new bone is periosteal, anteriorly and just below the incisors. This fits in quite well with Ewing tumor. The margin of an osteogenic tumor is often raised, forming the reactive triangle described by Codman. The tumor spreads along the shaft, raising the periosteum and forming a marginal triangle until the tumor destroys the new bone. One thing not emphasized is the point of origin, which is apparently the anterior margin of the bone and not the tooth. All the roots of the teeth, so far as I can see, are normal, so that the tumor presumably did not originate from any of the dental structures per se. We can rule out the adamantinomas and the whole group associated with the embryology of the dental structures in the development of this tumor. I should interpret it as a highly malignant growth, probably osteogenic sarcoma or Ewing tumor.

DR. KURT H. THOMA: It is significant that the tumor was not entirely in the bone, which is the site of an adamantinoma, although it is not entirely outside. In tumor of the jaw the main point to decide is whether it originated in the bone and grew in both directions — in the manner of a Ewing tumor or an osteogenic sarcoma — or whether it remained within the limits of the bone as do the central tumors of nonosteogenic origin, or whether it developed from the periosteum and later invaded the bone. If we can trust the former x-ray diagnosis and also the statement regarding the onset of the disease, it seems to me likely that the tumor originated from the periosteum. Therefore, it was a periosteal fibrosarcoma, which invaded the jaw.

There are three types of fibrosarcoma that occur in the jaw. One, which is intraoral, developing from the periosteum of the alveolar process or peridental membrane, forms multiple masses and is not so malignant as the subcutaneous type. There is a series of 35 cases reported by Pollack* in 1936 in which 25 patients had lived from six months to twelve years without recurrence, 3 were unimproved after operation, 3 had recurrences in from two to eight years, and in 3 the outcome was unknown. The second type of fibrosarcoma, which develops in the subcutaneous region of the jaw, is more malig-

*Pollack, W. *Das Schicksal der malignem Tumoren aus der Westdeutschen Kieferklinik seit dem Jahre, 1920.*, Düsseldorf, 1936.

nant, and the prognosis is poor. Some that I have seen have invaded the bone, and others have not. In one case, spicules of bone extended into the tumor, as seen in osteogenic sarcoma. These spicules are generally metaplastic bone growing from the jaw into the tumor. The third is the central type of sarcoma, which develops most frequently in the mandibular canal, from connective tissue around the nerves or blood vessels, with consequent pain, paresthesia, numbness of the lip, and loose teeth. Finally, the tumor generally is visible inside as well as outside the mouth, changing the appearance of the face. I believe that this tumor originated from the periosteum and invaded the jaw secondarily.

Dr. Grantley W. Taylor: We went through much the same process of reasoning as Dr. Goldman. In the Tumor Clinic, our first effort was to get an accurate diagnosis of the histologic type, because if the tumor was sensitive to radiation, we thought that that might be the proper way to handle it. Operation seemed almost impossible because of the extension of the tumor far back in the floor of the mouth, but following biopsy, which intimated to us that the tumor would be unlikely to respond favorably to radiation therapy, we decided on radical operation. We were able to remove the entire tumor, apparently without leaving any local process behind. We took some encouragement from the fact that before operation there was no evidence of dispersion or dissemination of the tumor. As Dr. Thoma pointed out, fibrosarcomas in relation to the mandible behave differently in general from those elsewhere in the body, may be confined as a local process longer and are less likely to disseminate. We therefore have some hope that this girl may have been cured by the mutilating operation. If so, she has her whole life before her, and the problem of restoration of function can be carried out at leisure.

Clinical Diagnosis

Sarcoma of jaw.

Dr. Goldman's Diagnosis

Periosteal fibrosarcoma of jaw.

Anatomical Diagnosis

Periosteal fibrosarcoma of jaw.

Pathological Discussion

Dr. Mallory: On the biopsy we reported osteogenic sarcoma. With further study I have changed my mind.

The photograph of the resected specimen (Fig. 3) shows that nearly all the mandible was resected. The bulk of the tumor was extraosseous, but there was tumor growth within the mandible itself. The sections disclosed a spindle-cell tumor that was rapidly growing, evidently highly malignant and rather poorly differentiated. In one of eight sections two small spicules of osteoid were found. Some question arises whether on that basis it was fair to consider this an osteogenic sarcoma. My opinion is that that diagnosis was not correct, that these spicules represented a slight reactive periosteal bone formation, which Dr. Thoma mentioned, and that the tumor must be classified as a periosteal fibrosarcoma.

Dr. Vincent Dole: Do you think that the incision done elsewhere had any influence on the spread or extension of the tumor?

Dr. Mallory: I cannot answer that question. Such an incision is certainly something that all of us prefer not to have done.

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SCHOOL HEALTH SERVICES

EVERY so often, at more or less irregular intervals, we become conscious of the fact that the child is father of the man and that something ought to be done about it. There may be many causes for such awakenings, but they are sure to come after the examination of recruits in time of war — a chastening experience. They may result in another White House conference or in a nationwide study of child health services or in a determined reformulation of our school medical services.

School medical services have come much to the fore in the last few years. They have been studied by a committee of the American Academy of Pediatrics, with recommendations; *Suggested School Health Policies* has been published by the Health Education Council; and the Massachusetts Medical Society, through a subcommittee, has investigated local conditions in the Commonwealth. The whole situation is admirably summarized elsewhere in this issue of the *Journal* by Dr. George M. Wheatley, assistant vice-president of the Metropolitan Life Insurance Company.

Four essential factors are necessary for the improvement of medical service in the schools: "co-operation between education and public-health authorities, provision for health services in the school that are satisfactory learning experiences for children, properly qualified school health personnel and the development and strengthening of relations with the medical profession."

At present in many states there are heartaches over the division of responsibility for school health between departments of education and departments of health. Friction and jealousy exist where properly worked out co-operation could bring contentment to both parties and improved service to the public.

The value of the physical examination often suffers, both because of undue restrictions that have been imposed by overmodest lawmakers who have refused to allow sufficient clothes to be removed from the child and because of overspecific requirements, such as where an annual examination is established by law regardless of lack of personnel to carry it out properly.

The function of the examination as a learning experience to the pupil is lost if it is casual or hurried, with no opportunity for a real "consultation"; and with younger children, corrective measures usually fail if the parent is not induced to be present. The time of the examination, if it is a good examination, has been aptly termed the "most 'teachable moment' — the best educational opportunity that exists in the schools," and the moment is often lost.

The school physician must himself be rescued from a situation where, often, as a harassed, underpaid official, untrained for the particular work in which he is engaged, he is doing poorly a part-time job for what little money there is in it. School health is a dignified, vital branch of public health, and it should be in the hands of capable, well trained, adequately paid career men and women. This applies not only to the physicians and dentists but to

the school nurses and, indeed, to the teacher who is closest of all to her charges.

Finally the practicing physician concerned — the family doctor or pediatrician — must be brought into the picture. Only with his interest and cooperation can a successful, fully rounded school health program be developed. On his advice a final decision often rests, and it is frequently he who must see that corrective measures are carried out.

SMALLPOX DECLINES

"SMALLPOX, once the scourge of our forefathers," wrote the late Dr. Benjamin White,* when he was director of the Massachusetts Antitoxin and Vaccine Laboratory, "has become such a rare disease in Massachusetts that we have become unmindful of its pestilential power . . . we do not realize that it still exists with all its horrible features, and that instead of being conquered, it is at best only held at bay by the continued practice of vaccination."

The world has always had its various pestilential visitations, coming at greater or less intervals over the centuries, and eventually sparing those countries where scientific control has been most intelligently applied. Smallpox, of these, has been the most tenacious, the most persistent, the one most frequently recurring in the long history of the scourges of mankind. It is known to have existed in Asia before the Christian Era; it came to Europe as early as the sixth century, reaching its height in the seventeenth and eighteenth centuries; it invaded the New World in the wake of the earliest pioneers. Thus, in the German-speaking countries, according to White, over 65,000 persons died of smallpox in 1796; in the early nineteenth century, 40,000 people succumbed annually in Prussia; and Boston itself was visited by smallpox in epidemic form twelve times between 1649 and 1792. Admiral Berkeley, in a speech before the House of Commons, in 1802, said: "It is proved that in this United Kingdom alone, 45,000 persons die annually of the smallpox; but throughout the world what is it? Not a second is struck by the hand of Time but a victim is sacrificed upon the altar of that most horrible of all disorders, the smallpox."

*White, B. *Smallpox and Vaccination.* Harvard Health Talks. 90 pp. Cambridge: Harvard University Press, 1924.

These words are written about a disease known since 1798 to be preventable and one against which the technic of prevention has been of late years so successful that in 1945 only 346 cases were reported in the entire United States, and only 5 in Canada. These figures, according to the Metropolitan Life Insurance Company's Information Service, represent the lowest ebb that smallpox has ever reached in the United States and, incidentally, furnish an example of what preventive medicine can accomplish, particularly when these cases are compared with 48,920 reported as recently as 1930. It is of local interest to note that the five New England states are included among the thirteen that were entirely free of the disease, and that the thirteen, although not representing exactly the original thirteen colonies, are all on the Atlantic seaboard.

It must be constantly emphasized, however, that eternal vigilance is the price paid for security: that where vaccination lapses smallpox occurs. Any reservoir of infection is the potential focus of future smallpox epidemics, and the return of members of the armed forces from overseas constitutes an extra hazard. To servicemen returning from the Orient can be attributed the recent outbreaks of virulent smallpox in San Francisco and Seattle, which, fortunately, were quickly brought under control by quarantine and mass vaccination.

MASSACHUSETTS MEDICAL SOCIETY

COMMITTEE TO MEET WITH GENERAL HAWLEY

Members of the Massachusetts Medical Society who wish to participate in the plan for the local care of veterans and who have not yet sent in their registration forms are urged to do so at once.

Those physicians who have already registered as specialists, and who would also like to give general physical examinations should communicate with Humphrey L. McCarthy, M.D., 479 Beacon Street, Boston.

HUMPHREY L. MCCARTHY, *Chairman*

DEATH

GRANT — Justin F. Grant, M.D., of Boston, died January 26. He was in his sixty-ninth year.

Dr. Grant received his degree from Johns Hopkins University School of Medicine in 1903. From 1903 to 1910 he was professor of anatomy and pathology at the University of West Virginia and from 1910 to 1912, professor of anatomy at the Atlanta College of Physicians and Surgeons. He had practiced in Boston for many years. He was a fellow of the American Medical Association.

A sister, a son and a daughter survive.

A HUNDRED YEARS AGO

Letters and printed reports by the last steamer show that the Boston Letheon is well received in London. Mr. Liston, the great surgeon, has amputated twice with marked satisfaction, while the patient was under its influence. — On Wednesday last, although the weather was unfavorable, a good number of Counsellors of the Massachusetts Medical Society were punctually present at 11 o'clock, the hour designated in the notices of their meeting. Some alterations were made in the by-laws, which in due time will be published. Dr. Bigelow, the President, announced that he should not be a candidate for office the ensuing year. A change of feelings, and of policy, too, on the part of some of the gentlemen who opposed the election of delegates to the last National Medical Convention, was as striking as it was gratifying. The following members were nominated from the Chair, and elected delegates to the next National Convention in May, viz., Dr. Stephen W. Williams, Deerfield; Dr. Enoch Hale, Boston; Dr. Elisha Huntington, Lowell; Dr. A. L. Peirson, Salem; Dr. Royal Fowler, Stockbridge; Dr. J. V. C. Smith, Boston; Dr. Joseph Sargent, Worcester; Dr. Z. B. Adams, Boston; Dr. Lyman Bartlett, New Bedford; Dr. E. W. Carpenter, Sandwich; Dr. Wm. Bridgeman, Springfield; Dr. O. W. Holmes, Boston; and Dr. George C. Shattuck, Jr., Boston. Other business was despatched actively, yet with due regard to the best interests of the institution and those associated with it. — A lady, in the West, recently gave birth to four daughters, all represented to be doing well. — In the fifth Massachusetts Registration Report, several tables are presented to show the average value of life in persons who pursue different occupations. Fourteen clergymen were carried to an aggregate of 897 years, which shows the average age to have been 64.07 years. Eight lawyers lived to an average of 59, by which it appears that there is nothing essentially injurious to the machinery of organic life in that profession. Twenty-one physicians had allotted to them an average of only 47.64 years. There are few or no holidays for this class of men. Professional cares prey upon constitutions operated on by other forces, such as exposure to all the vicissitudes of weather, broken sleep, irregular meals, etc., which individually war against a long life. Teachers are on the gain in point of longevity, which may probably have been caused by the better systems of ventilation demanded from one season to another by those who are especially interested in the public health. Those styled gentlemen, in the old Puritan Bay State, seem to have spun out the thread of life to a very satisfactory period. A furnace man had the shortest life in the whole column of 137 trades and professions. It may be remarked, with safety, that there is room for vast improvement in this new idea, in the United States, of registration. — Dr. I. P. Smith, of Gloucester, reports the case of a woman who was married young and at the time considered a remarkably slender girl, being subject to cough upon the slightest exposure. Her only brother and sister both died of *tubercular phthisis* and both parents also died of the same disease. She was 39 years old on October 28th, 1846, and never had a sick day since her marriage December 9th, 1826, except the usual sickness consequent on parturition. During this period she has given birth to eight children all of whom are now living and in perfect health. She has been constantly nursing for a period of nearly twenty years — never weaning one child till the birth of another compelled her to, for the convenience of the infant. More than once, when *in labor*, Dr. Smith has seen her child of the last birth at the breast. He wishes to know whether, if similar cases with a like favorable result are reported; *protracted lactation*, especially during pregnancy, might properly be inferred to possess a prophylactic power, even when there exists a well-marked hereditary predisposition to pulmonary disease. — A public announcement has been made in New York of another new "discovery" under the name "spirometer" for ascertaining the condition of the lungs and "air passages." Physicians and the public have been lately invited to the Astor House to inspect the instrument. Those who have responded to the call have been introduced to a gasometer, resembling those seen in every chemist's laboratory and used in ordinary by the public exhibitors of the laughing gas. Its only novelty or improvement consists in a tube movably attached to the top of the gas holder, while itself is filled with water, and a scale attached to the top of the cylinder designed to show the amount of air which an individual can expire by blowing into the tube. The idea that even having ascertained the capacity of the lungs, by measuring the volume of air expelled by a full expiration, we should thereby learn anything of the true pathological state, in the variety of morbid affections of the pulmonary tissues, is a *reductio ad absurdem* in itself, besides being at war with medical philosophy and the lessons of experience. — The *Boston Transcript* intimated last week that Dr. Warren was about resigning his connection with the Medical College in this city. — At a meeting of the Committee on Dissertations of the Boylston Medical Society held February 10th, three prizes were awarded. The dissertations this year, we learn, were of an unusually high order, and some difficulty was experienced in making a selection by the Committee. — Extract from the *Boston Medical and Surgical Journal*, February, 1847.

R. F.

CORRESPONDENCE

ILLEGIBLE AND INCOMPLETE DEATH CERTIFICATES

To the Editor: Since assuming the office of City Registrar I have become increasingly aware of a condition in the writing of original certificates of death by physicians that creates a serious hardship on all who are engaged in the processing of these documents, including the personnel of the Registry Department. The certificates, in many instances, are illegibly written, the required data are lacking and there are numerous other conditions which make the copying of these records almost an impossibility without soliciting confirmation by telephone from the physician who made out the certificate or referring to medical dictionaries in an effort to determine clearly the causes of death.

It is not my purpose to become critical of the medical profession, recognizing only too well the tremendous task imposed on physicians at this time, but it is my feeling that if this matter could be brought to their attention an improvement in the quality of the records being forwarded to this department might be brought about.

City Hall Annex
Boston 8

MICHAEL J. MANNING,
City Registrar

AORTIC OCCLUSION

To the Editor: Dr. Edward D. Maire's article, "Coarctation of the Aorta," which appeared in the January 2 issue of the *Journal* was stimulating. He failed, however, to mention a condition in his paper that I believe should be called to the attention of your readers. This is atheromatous occlusion of the abdominal aorta or of both common iliac arteries.

The brachial blood pressure in many cases is elevated. The pressure in the lower limbs is invariably low. The femoral pulsations are reduced or absent. Symptoms due to the ischemia of the lower extremities, such as intermittent claudication, pain and early fatigability, are usually present. In the differential diagnosis evidence in favor of coarctation of the aorta, such as scalloping of the ribs and absence of the aortic knob, is lacking. Evidence in favor of atheromatous occlusion consists of the following: the onset of initial symptoms past middle age; the presence of x-ray findings of calcification of the aorta or iliac or femoral arteries; and the presence of diabetes or hypercholesterolemia. The abdominal aorta may also be occluded from other causes, such as an ovarian cyst. In such cases the presenting symptoms usually include the intra-abdominal mass.

Owing to the fact that there is no practical method of exploration of the abdominal aorta, its occlusion is frequently overlooked. A method of retrograde abdominal aortography has been reported by Dr. P. L. Farinas (*Surgery* **18**:244, 1945, and *American Journal of Roentgenology and Radium Therapy* **55**:448, 1946). I doubt, however, that this method will receive widespread use in this country.

ROY J. POPKIN, M.D.

2007 Wilshire Boulevard
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BOOK REVIEWS

Principles of Dynamic Psychiatry, Including an Integrative Approach to Abnormal and Clinical Psychology. By Jules H. Masserman, M.D. 8°, cloth, 322 pp., with 4 plates. Philadelphia and London: W. B. Saunders Company, 1946. $4.00.

This is another volume of psychiatry that will not be generally adopted as a textbook for academic undergraduate teaching. The author states that his immediate purpose of getting into print is to express certain fundamentals of modern dynamic psychiatry that are now being taught by him and his colleagues only through lecture and precept. He has sought for books that, breaking with tradition, present the fundamentals of dynamic psychology and clinical psychiatry briefly, clearly and systematically. In his attempt to bring together the psychoanalytic, biologic and physiologic approaches, his formulations are not always presented briefly, clearly and systematically.

Behaviorism is rather in the foreground; illustrative clinical records are utilized freely, and original animal experiments contribute the most intriguing part to the book. The student may be misled to believe these to be the stuff that so-called "dynamic psychiatry" is made of. "Biodynamics of Normal and Abnormal Behavior" is a long and involved chapter in which the author attempts to correlate various theories, some of which are fundamentally and traditionally opposed to each other. He admonishes man to cease thinking of himself as so different from other animals, and he states that "psychology and psychiatry may profit immeasurably by becoming more 'catomorphic' or even 'amoebamorphic' as corrective steps toward the ultimate conceptual integration of all behavior theory."

The author has put much work in this volume, which will be read with interest by specialists. He refers repeatedly to a companion volume on clinical psychiatry and therapy that is to follow.

Considerable space is given to neurotic reaction types and borderline cases. The psychoses are not the center of the work, and the author has studiously deviated from the orthodox diagnostic formulations and psychiatric clinical entities.

There is a complete bibliography and a glossary of about twelve hundred psychiatric terms that will be helpful to the student.

Modern Trends in Child Psychiatry. Edited by Nolan D. C. Lewis, M.D., and Bernard L. Pacella, M.D., with the assistance of Gertrud M. Kurth, Ph.D. 8°, cloth, 341 pp. New York: International Universities Press, 1945. $6.00.

This volume contains the lectures on child psychiatry and guidance given at the New York State Psychiatric Institute by leading authorities in 1943 and 1944. The various aspects and manifestations of anxiety and the primary behavior disorders, psychiatric reactions and delinquencies in children are dealt with. New methods and technics in diagnosis and therapy, as well as the psychobiologic approach, emphasizing parent-child and living social relations, are discussed. This book is valuable as a record of the lectures and should be in all psychiatric reference collections.

Bioenergetics and Growth, with Special Reference to the Efficiency Complex in Domestic Animals. By Samuel Brody, Ph.D. A publication of the Herman Frasch Foundation. 8°, cloth, 1023 pp., with illustrations and tables. New York: Reinhold Publishing Corporation, 1945. $8.50.

This volume records investigations made in the comparative study of the energetic efficiencies of agricultural processes. The subjects discussed cover a wide territory. Many of the factors influencing efficiency, such as enzymes, minerals, vitamins and hormones, are analyzed largely with the aid of the literature on the various subjects. The material is well documented and contains much of value in comparative physiology, especially concerning homeostasis, calorimetry, metabolism, growth rates, aging, nutrition and muscular work. The text is well written and illustrated with graphs, charts and tables. It is printed with a good type on good paper. This valuable work should be in all physiologic reference collections.

Journal of the History of Medicine and Allied Sciences. Vol. 1, No. 1 (January, 1946). 4°, cloth, 182 pp. New York: Henry Schuman, 1946. $2.50.

The publication of a new quarterly journal devoted to medical history and the allied sciences will receive a warm welcome from medical historians in America and throughout the world. With the coming to an end of the *Annals of Medical History*, the United States was left with only one journal, the excellent *Bulletin of the History of Medicine*, to supply a growing need for publications in this field. Many foreign journals, of similar scope, were discontinued during the war, some permanently.

The new journal fills a want and does it admirably. Neat in appearance, expertly edited and well printed and illustrated, this publication fully justified its existence in the first number, issued in January, 1946. Subsequently, three other numbers have more than come up to expectations set by the initial issue. The editor, Dr. George Rosen, is ably assisted by a board of qualified historians and consulting editors from many countries. No student of medical history can afford to miss a single number, and all libraries, medical as well as general, should subscribe.

Skin Diseases in Children. By George M. MacKee, M.D., and Anthony C. Cipollaro, M.D. 8°, cloth, 448 pp., with 225 illustrations. New York: Paul B. Hoeber, Incorporated, 1946. $7.50.

Skin diseases in children are extremely interesting and often present entirely different pictures from those caused by the same cutaneous disturbances in adults. The need of such a book as this is evidenced by the popularity of the first edition. The book is well written, and the print is excellent; the illustrations are numerous, depicting quite well the entities represented. There are several noteworthy chapters, especially those on allergic dermatoses, contagious diseases and syphilis. Certain other chapters, such as the one dealing with vesicular and bullous diseases, are lacking in the completeness expected in a book of this type, since the diseases discussed are fairly frequent in infants and children. It is a valuable reference book for the student, general practitioner and pediatrician.

The Diagnosis of Nervous Diseases. By Sir James Purves-Stewart, K.C.M.G., C.B., Knight of St. John of Jerusalem, M.D. (Edin.), F.R.C.P. Ninth edition. 8°, cloth, 880 pp., with 358 illustrations. Baltimore: The Williams and Wilkins Company, 1945. $11.00.

The ninth edition of this widely read book contains a considerable number of changes, but not so many as the author originally planned. He came to this country to evaluate American neurology during the war, and much of the text was revised with the aid of friends during his visit. New illustrations were furnished to replace some of the old, and the book was completely re-edited. Unfortunately, all this labor ended in disaster, for the new illustrations and fresh references, along with some of the text, were sunk in the mid-Atlantic by enemy action. The author was on another ship and therefore escaped. In spite of this setback, which might well have overwhelmed a less formidable person, the author made a further revision after returning to England, which resulted in the present text. There are enough changes to justify a new edition, and this volume will be widely welcomed by neurologists and medical students. It can be strongly recommended as in the past and is a welcome addition to the neurologic literature of the present day.

Gastro-Enterology. Volume III. *The liver, biliary tract and pancreas, and secondary gastro-intestinal disorders.* By Henry L. Bockus, M.D., and colleagues. 8°, cloth, 1091 pp., with 427 illustrations. Philadelphia and London: W. B. Saunders Company, 1946. $11.00.

This is a valuable book, half of which was written by Dr. Bockus and half by his colleagues in the faculty of the University of Pennsylvania Graduate School of Medicine, as in the two previous volumes. The style is pleasant; the book is well printed and bound, is accurate and complete and is beautifully and copiously illustrated. At the beginning of each chapter there is an index of contents, and a well chosen list of references is supplied at the end. About seven hundred pages are given to diseases of the liver and gall bladder, one hundred and twenty-five to diseases of the pancreas, sixty to gastro-intestinal parasites and one hundred to secondary affections of the gastrointestinal tract. This volume is especially welcome because of the recent increase in the frequency of diseases of the liver and of recent improvements in methods of diagnosis and treatment.

The material is so varied and extensive that it is difficult to single out special chapters for review. Many controversial subjects are treated with skill and good judgment, such as medical duodenal drainage, the medical treatment of gallbladder disease, the question of early or late operation in the acute gall bladder, dyskinesia of the gall bladder, the surgery of so-called "silent gallstones," visceroptosis and the diagnosis and treatment of food allergy.

The complex physiology of the liver is described in clear and simple terms. Twenty-five liver-function tests are described, some of which are expensive and technically difficult, whereas only five or six of the simple tests are in routine daily use in most clinics. Possibly, the inclusion of so many tests that are only occasionally used may be confusing to the practitioner. Aspiration biopsy of the liver is described in half a page; this might be enlarged and a simple technic given, owing to its recent increasing use.

A large number of data on infective hepatitis and its epidemiology, transmission, pathology, early detection, diagnosis and prognosis are now becoming available from intensive study of the vast epidemics of World War II and will supplement and change the present chapters on acute hepatitis. Acute infectious hepatitis and acute yellow atrophy of the liver are described in separate chapters as different diseases, as in previous textbooks, but there is much recent evidence that they are simply different degrees of severity of the same disease.

The technical details of the treatment of patients with serious liver disease by carbohydrates, proteins and amino acids could be much improved both in acute hepatitis and in cirrhosis. Plasma transfusion, with its 5 or 6 per cent of protein, with a few grams of methionine a day, does not go far in restoring body protein reserves.

Lyons's biliary drainage is fully described, and a conservative estimate given of its value in diagnosis. Its use in treatment is not advised except in chronic infective cholangitis.

Biliary dyskinesia has been much discussed of late, and it is refreshing to find the statement, "As a working clinical diagnosis it should have a most insignificant place. . . . We have been unable in a single instance to agree upon the diagnosis of biliary dyskinesia . . . [in patients who have not been operated upon]."

In diseases of the pancreas the value of laboratory tests in the diagnosis of acute cases and the difficulties in chronic cases are pointed out.

There is an excellent short chapter on splenomegaly and its relation to diseases of the liver, heart and portal vein infections, hemolytic and other anemias, Hodgkin's disease, leukemia and so forth.

The chapter on functional diseases of the gastrointestinal tract is written by a neuropsychologist, and is much better than the usual chapter on these subjects. The value of psychologic and hygienic treatment is stressed in preference to drugs and placebos.

The book closes with a discussion of food poisoning of various kinds.

The work as a whole is excellent, and is highly recommended both to the specialist and as a reference book for the general practitioner.

Asclepius: A collection and interpretation of the testimonies. By Emma J. Edelstein and Ludwig Edelstein. Volume I: 4°, cloth, 470 pp. Volume II: 4°, cloth, 277 pp. Baltimore: Johns Hopkins Press, 1945. $7.50 (two volumes).

Asclepius in antiquity was the main representative of divine healing, — an important form of ancient medical treatment never opposed by ancient physicians, — and his worship played such a part in the final stage of paganism that he was judged the foremost antagonist of Christ above all other genuinely Greek gods. This work is devoted to a discussion of both aspects of the subject: Asclepius as the god of medicine and the Savior.

The first volume contains a collection of the ancient references to the life and deeds of Asclepius, his cult, images and temples; the second comprises an analysis of the material assembled in volume one. The material is restricted to written evidence and does not consider the cultural evidence portrayed in sculpture and painting and on coins. Although the work aims at an insight into the essence of Asclepius and of the cult attached to him, it also intends to provide a commentary on the whole ancient testimony on Asclepius preserved in books and on stone. The text is well written and printed on good paper, with a good type. This scholarly treatise should be in all medical-history collections, both public and private.

Surgical Treatment of the Motor-Skeletal System. Part One: *Deformities, paralytic disorders, muscles, tendons, bursae, new growths, bones, joints, amputations.* 4°, cloth, 641 pp., with 520 illustrations and a color plate. Part Two: *Fractures, dislocations, sprains, muscle and tendon injuries, birth injuries, military surgery.* 4°, cloth, 639 pp., with 543 illustrations. Supervising editor, Frederic W. Bancroft, M.D. Associate editor: Clay R. Murray, M.D. Philadelphia: J. B. Lippincott Company, 1945. $20.00.

This, as its name implies, is a two-volume treatise on the surgical treatment of orthopedic disabilities. It has been edited most ably by Drs. Bancroft and Murray, of Columbia University College of Physicians and Surgeons. The con-

tributors to the various sections are all well known in their fields. The various chapters are written in a clear, commonsense manner. There should be no difficulty in following the instructions given. Although one might prefer, for the sake of completeness, to have all motor skeletal difficulties discussed, only those amenable to surgical therapy are mentioned. Most doctors with experience in orthopedic surgery will not agree unreservedly with the treatment suggested, but they will learn — as the reviewer has learned — many helpful new points in therapy. The second volume is especially well done. The format is good, and the printing and the illustrations are excellent. These helpful and practical books can be recommended and will be most useful to orthopedic and industrial surgeons.

Correction: In the listing of *A Bibliography of Infantile Paralysis*, a review of which appeared in the January 2, 1947, issue of the *Journal*, it is erroneously stated, "Compiled by Ludwig Hektoen, M.D." The statement should read, "Compiled by Ludwig Hektoen, M.D., and Ella Salmonsen."

BOOKS RECEIVED

The receipt of the following books is acknowledged, and this listing must be regarded as a sufficient return for the courtesy of the sender. Books that appear to be of particular interest will be reviewed as space permits. Additional information in regard to all listed books will be gladly furnished on request.

The Electron Microscope: An introduction to its fundamental principles and application. By E. F. Burton, head of the Department of Physics and director of the McLennan Laboratory, University of Toronto; and W. H. Kohl. Second edition. 8°, cloth, 325 pp., with 125 figures and 66 plates. New York: Reinhold Publishing Corporation, 1946. $4.00.

This second edition of a standard work has been revised throughout, and the text has been rearranged. The aim of the book is to provide an introduction to the fundamental principles and applications of the electron microscope, and in this connection some material has been eliminated as being too special for the scope of the book. The detailed description of the Johannson–Brüche electrostatic electron microscope has been omitted from this edition, and the chapter on the history of the electron miscroscope has been eliminated, parts of this chapter being incorporated in other chapters. The chapters on electron optics have been enlarged, and the chapter on the compound magnetic electron microscope has been rewritten completely and much new material added. In the chapter on the application of the microscope, which has been largely rewritten, the illustrations of the accomplishments of the microscope are included. A complete bibliography recently prepared by Claire Marton, of Stanford University, and Samuel Sass, of the University of Michigan, is included with the permission of the authors and the publishers. Some data have been added concerning the organization of the Electron Microscope Society of America. Both the first and second editions of this book should be in all libraries having an interest in the subject.

Public Health the American Way. By H. B. Anderson. 8°, cloth, 238 pp. New York: Citizens Medical Reference Bureau, Incorporated, 1945. $2.50.

The central thought that this book seeks to convey is that compulsory sickness insurance and similar schemes to socialize medicine nullify the Bill of Rights of the Constitution.

Trends of Mental Disease. American Psychopathological Association. 8°, paper, 114 pp. New York: King's Crown Press, 1945. $2.00.

This small monograph, by various authors, constitutes a statistical analysis of the incidence of mental disease. The authors discuss the census statistics of patients in hospitals for mental disease in the period 1933-1942, the expectation of mental disease in New York State during the years 1920, 1930 and 1940, and the trend of mental diseases in Illinois during the period of 1922 to 1943. Two concluding chapters consider the trends of mental disease in the Navy and the neuropsychiatric screening of Selective Service registrants in New Jersey. The first chapter forecasts the trends of mental disease in the United States during the period 1940 to 2000.

A Blind Hog's Acorns: Vignettes of the maladies of workers. By Carey P. McCord, M.D. 8°, cloth, 311 pp., with illustrations by Strobel. Chicago: Cloud, Incorporated, 1945.

The author, who is a specialist in the field of occupational diseases, relates his experiences as an industrial physician.

1021 Answers to Industrial Health and Safety Problems. Edited by Jack E. Weiss, editor, *Occupational Hazards Magazine*, and the following associates: John MacKoVace, B.A., Lester P. Aurbach, B.A., Helen A. Buchman, M.A., and Jerome R. Peskin, M.A. 8°, cloth, 699 pp., with 327 illustrations. Cleveland: Occupational Hazards, Incorporated, 1943. $10.00.

This volume constitutes in a way an encyclopedia of industrial medicine. The text is divided into twelve divisions falling into two major classifications — industrial diseases and hazards, and safety provisions against accidents. Special reading bibliographies are appended to each subject. A valuable appendix on the classification of potential hazards by chief industries concludes the text. A large comprehensive index makes available all material contained in the volume. The work should prove of value as a ready reference source to all those interested in public health and industrial medicine.

The Principles and Practice of Tropical Medicine. By L. Everard Napier, F.R.C.P. (London), consultant to the Secretary of War, visiting lecturer on tropical medicine, Army Medical School, and visiting lecturer on tropical medicine, Harvard Medical School. 8°, cloth, 917 pp., with 195 illustrations and 32 tables. New York: The Macmillan Company, 1946. $11.00.

This new textbook on tropical medicine is directed wholly for clinical and preventive application. The author has attempted to give an accurate and concise account of the more important tropical diseases from the viewpoint of epidemiology, etiology, pathology, symptomalogy, diagnosis, prevention, treatment and prognosis, and discusses in a general way such relevant subjects as methods of mitigating the effects of a tropical climate, nutrition and anemia in the tropics, and snakes and snake bites. The material is well organized, and many of the subjects are preceded by a short, historical paragraph. Selective lists of references are appended to each subject. Good indexes of subjects and authors are appended to the text. This new textbook by an outstanding authority should be in all medical libraries and the libraries of physicians interested in tropical medicine.

Public Baths and Health in England, 16th-18th Century. By Charles F. Mullett. Supplement No. 5 to the *Bulletin of the History of Medicine.* 4°, paper, 85 pp. Baltimore: Johns Hopkins Press, 1946. $1.50.

This historical monograph is well documented, with references to the popular literature of the period. Appended to the text is a bibliography of books and pamphlets on the subject that should be of value to all interested persons. This monograph should prove valuable as a reference source on the subject.

An Introduction to Essential Hypertension. By Richard F. Herndon, M.D. 8°, cloth, 88 pp. Springfield, Illinois: Charles C Thomas, 1946. $2.50.

In this small book the author has presented a concise statement of what seems to be the present concept of hypertension in such a way that the ordinary practitioner of medicine can use it as a text for first reference. Following a definition of hypertension, the various aspects of the condition are considered in the following order: etiology and mechanism, physiology, pathology, clinical aspects, prognosis, diagnosis and treatment. For those who wish to pursue the subject further, the author has given as footnotes one hundred and thirty-nine pertinent references. This small volume should prove useful to the practicing physician.

Skin Diseases, Nutrition and Metabolism. By Erich Urbach, M.D., associate in dermatology, University of Pennsylvania School of Medicine, and chief of Department of Allergy, Jewish Hospital, Philadelphia. With the collaboration of Edward B. LeWin, M.D., associate in medicine, Jewish Hospital, Philadelphia. 8°, cloth, 634 pp., with 266 illustrations and 112 tables. New York: Grune and Stratton, 1946. $10.00.

In this new book Dr. Urbach stresses the use of dietary measures in the treatment of dermatoses. The text is divided into five parts: the influence of nutrition on the physiology of the skin; nutritional causes of dermatoses, including food allergy; the influence of diseases of the gastrointestinal tract, liver and pancreas on the skin; and nutritional therapy of skin diseases followed by a series of nutritional tables. A bibliography of one thousand three hundred and seven references is carried throughout the text as footnotes to the various chapters. Indexes of authors and subjects conclude the volume. This book should be in the reference collections of all medical libraries and should prove of value to allergists and dermatologists.

Alcohol Reaction at Yale. By Ernest Gordon. 8°, paper, 87 pp. Francestown, New Hampshire: The Alcohol Information Press, 1946. Single copy, $1.00, ten copies, $6.00, postpaid.

This pamphlet constitutes an argument for prohibition.

NOTICES

ANNOUNCEMENT

Dr. Raymond Gelfman announces the opening of his office for the practice of internal medicine at 10 Chestnut Street, Springfield.

FOOD AND HEALTH CONFERENCE

On March 20 the North Metropolitan District of the Massachusetts Department of Public Health will present a Food and Health Conference in the auditorium of the Public Works Building, 100 Nashua Street, Boston. The morning session will be held from 10:00 to 12:00, and the afternoon session from 2:00 to 4:00.

This meeting has been planned for health workers in the district. Discussions on the psychiatric problems in dietetics, recent developments in nutrition research, technics for teaching nutrition, sanitation and visual aids have been planned, and there will be four exhibits. All are urged to attend this meeting and learn latest information regarding nutrition and new technics for teaching.

MASSACHUSETTS PHYSICIANS' ART ASSOCIATION

The Massachusetts Physicians' Art Association has been established to encourage and stimulate the interest of physicians in drawing, painting, sculpture and photography. Any member of the Massachusetts Medical Society is eligible to join the association and may do so by sending in the annual dues ($2.00) to the treasurer, Dr. Robert W. Buck, 5 Bay State Road, Boston. This sum is to cover the cost of notices of meetings and the expenses of the yearly exhibition, which will be held this year at the Hotel Statler in conjunction with the annual meeting of the Massachusetts Medical Society, May 20 to 22. It is planned to hold meetings in Boston each month in the winter, with informal talks or classes for those who wish to draw or paint. Notice of the meeting in March will be sent on receipt of the dues. Additional information, if desired, may be obtained from the secretary, Dr. Somers H. Sturgis, Massachusetts General Hospital, Boston 14.

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the auditorium of the Beth Israel Hospital on Tuesday, March 4, at 8:15 p.m. Dr. Murray J. Shear, chairman of the Chemotherapy Section, National Cancer Institute, will speak on the subject "The Chemotherapy of Cancer." Drs. William Dameshek, Saul Hertz, Ira Nathanson and Arnold Seligman will participate in the discussion.

WINTHROP COMMUNITY HOSPITAL

The regular monthly meeting of the staff of the Winthrop Community Hospital will be held on Thursday, March 27, at 9 p.m. at the hospital. Dr. Howard A. Hoffman will speak on the subject "Urologic Problems in General Practice."

NEW ENGLAND HEALTH INSTITUTE

The New England Health Institute will be held at the University of New Hampshire, Durham, New Hampshire, on June 16, 17 and 18. This will be the first meeting since the war. A comprehensive program is being arranged, and the speakers will include many of the outstanding health and education authorities in the country. Special attention is being given to the timing of the different sections so that similar subjects will not overlap.

The facilities of the University will be at the disposal of those attending. Rooms will cost from $1.00 to $1.50 per day, special provisions being made for married couples. The school dormitories will be conducted on a hotel basis. Meals will be served in the dining halls at an approximate cost of $1.50 to $1.75 per day. There will be a banquet on Tuesday evening.

Since a large attendance is expected, all who plan to participate should register early. More detailed information will appear in a later issue of the *Journal.*

THIRD AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The Third American Congress on Obstetrics and Gynecology will be held September 8 to 12, 1947, in St. Louis. The program will feature general sessions for all groups making up the Congress, as well as small individual group meetings and round-table discussions. The morning sessions will be panel-type presentations of the following subjects: anesthesia and analgesia; cancer; and cesarean section. The afternoon meetings of the medical section of the Congress will consider psychosomatic aspects of pregnancy, pregnancy complicating cardiac disease, diabetes and tuberculosis; recent advances in endocrinology. Round-table discussions from four to five o'clock daily will consider such topics as etiology of abortion, asphyxia, fibroids, prolonged labor, infertility, early ambulation, adolescence, treatment of abortion, genital relaxation, ovulation, the menopause, the cystic ovary, uterine bleeding, nutrition in pregnancy, geriatric gynecology, endometriosis and erythroblastosis.

INTERNATIONAL CANCER RESEARCH CONGRESS

The Fourth International Cancer Research Congress will be held in St. Louis on September 2 to 7. The Union Internationale contre le Cancer having accepted the invitation of the American Association for Cancer Research, the congress will be held under the joint auspices of these two organizations, with Dr. E. V. Cowdry, professor of anatomy, Washington University School of Medicine, and director of research at the Barnard Free Skin and Cancer Hospital, serving as president. The State Department in Washington has approved of the congress, and official invitations will soon be sent to all foreign governments that are to be asked to send delegates.

Initial steps in the organization of the congress have already been completed. In addition to Dr. Cowdry, Dr. J. Godard, president of the Union Internationale contre le Cancer, and Dr. W. U. Gardner, president of the American Association of Cancer Research, will serve as *ex-officiis* members of the Executive Committee. The following personnel have accepted committee chairmanships: A. N. Arneson, St. Louis — Local Arrangements; S. Bayne-Jones, New Haven — Finance; C. W. Larimore, New York City — Exhibits; L. A. Scheele, Bethesda, Maryland — Governmental Liaison; M. G. Seelig, St. Louis — Publicity; and Shields Warren, Boston — Program.

Headquarters will be at the Hotel Jefferson, St. Louis, where some 300 rooms will be available for guests. In addition, other nearby St. Louis hotels have signified a willingness to make reservations on advance notification by those contemplating attendance at the congress.

(*Notices continued on page xv*)